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"Scire est nescire, nisi id me
Scire alius sciret."

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THE CAREY COOMBS MEMORIAL LECTURE

DELIVERED AT A MEETING OF THE SOCIETY ON WEDNESDAY, MAY 5th, 1937.

THE PRESIDENT (Dr. R. C. CLARKE) *in the Chair.*

BY

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ON

THE PATHOLOGY AND SURGICAL TREATMENT OF CARDIAC ISCHÆMIA.

IN the first place I should like to express my gratitude for the opportunity of delivering this lecture. It is quite clearly a lecture which could better be delivered by many more competent authorities than myself; for it is a lecture in memory of a great physician who

spent his active life in the study of cardiovascular disease, while I have merely laboured on the fringes of the subject, and that only of recent years.

I was already familiar with some of Coombs's writings, and it has been a most welcome task during the last few weeks to review in closer detail those which I had not previously read. It soon became apparent to me that many of the more significant aspects of his work could not be dealt with in this lecture. There was his discovery of the "submiliary nodule" in rheumatic carditis, his important contributions to the pathology and treatment of rheumatism, and his valuable work on its social and economic importance. There was also his very beautiful and detailed description of some of the rarer manifestations of cardiovascular disease — I refer especially to his important paper on abnormalities of the pulmonary artery. However, on reading his Lumleian Lecture for 1930 I was struck by the accuracy with which the pathology of cardiac ischæmia was described, and in some of his other papers I have looked for further evidence of his views on coronary disease, a subject which is relevant to our work in the Lambeth Cardiovascular Clinic. I mean to show very briefly how his views have been confirmed and amplified by subsequent clinical and experimental work.

Anginal pain is common to all types of cardiac ischæmia, and in 1930 the "aortic" theory of cardiac pain, of which Sir Clifford Allbutt had been so able an exponent, had still its strong adherents. Coombs however asserted that anginal pain originated in the heart itself, for he had observed that the anginal pain

of syphilitic aortitis differed in no way from the angina associated with generalized atheroma of the coronary tree; and while it might well be that the aortic plexus could be involved in aortitis, this was clearly not the case in coronary sclerosis. The one factor common to all types of coronary insufficiency was a defective supply of oxygen to the myocardial cells, and Coombs therefore considered that interference with cell metabolism caused cardiac pain. There is much recent work to support this view—the clinical researches of Sir Thomas Lewis may be cited.

In syphilitic coronary insufficiency there is a normal peripheral coronary tree—a very beautiful injection specimen prepared by Dr. Bruce Perry illustrates this particular point in the lecture; but as Coombs himself expressed it, the coronary blood supply is strangled at its source, for the orifices of the vessels are obstructed, and in addition loss of the normal elasticity of the wall of the aorta, together with deformity in varying degree of the aortic valves, disturbs the normal mechanism by which blood is fed to the coronary tree. In coronary atheroma Coombs believed that it was loss of the elasticity of the coronary vessels which rendered them incapable of those subtle variations which adequate function of this vital segment of the vascular tree demands. Loss of elasticity in its most extreme form is, of course, seen in calcification of the coronary vessels. It was from this type of cardiac ischæmia that John Hunter died. Coombs had seen coronary thrombosis occur as a complication of coronary atheroma, and he appreciated to the full the part which some incidental infection, especially of the respiratory tract, may play in

determining the moment at which an actual deposit of clot on some roughened area of the vessel wall may cause complete obstruction of its lumen.

The anginal pain of severe anæmia Coombs explained on the grounds that here, although distribution of the blood supply to the heart could proceed normally, the fluid supplied was incapable of providing the myocardium with that rich oxygen supply which under all conditions normal cardiac action requires.

The most striking evidence of the importance of cardiac ischæmia as a common factor in a variety of heart affections has been provided by Büchner, Weber and Haager. Their monograph contains a careful record of forty-three fatal cases of cardiac ischæmia and correlation of the clinical findings, including, of course, electrocardiographic studies, with the post-mortem appearances both macroscopic and microscopic. Although in many of their cases anginal pain was a prominent symptom this was not invariable, and in some cases dyspnœa on attempted exertion, recurrent attacks of pulmonary œdema or attacks of congestive heart failure provided the evidence for impaired cardiac function. The problem of the ischæmic heart, which may progress even to the point of perforation of an infarct without pain, is one of the most fascinating in cardio-vascular pathology, and it may be that its solution lies in more systematic examination of the autonomic nervous system in such cases. Their series includes obvious cases of coronary thrombosis in an otherwise normal coronary tree, thrombosis complicating atheroma of the coronary arteries, cases of hypertensive heart failure with gross atheroma of

the tree but no actual obstruction, fatal cases of syphilitic aortitis when only the orifices of the coronary vessels were affected, and even one or two cases of heart failure following chronic bronchitis and emphysema in the presence of coronary atheroma. In all this group of cases there were characteristic electrocardiograms, and at autopsy careful examination of the heart revealed pathological changes in the myocardium. After obstruction of a main coronary artery gross evidence of an old or recent infarct was invariably present, and in other cases, where no actual block of the circuit was present but merely a general impairment of its lumen, scattered areas of recent necrosis or old fibrosis could invariably be detected by serial sections.

As Coombs pointed out, there is one condition in which angina may be a prominent symptom despite normal coronary arteries, and this is severe anæmia. Büchner in his ingenious experiments provided a rational explanation of this apparent inconsistency. He produced an intense anæmia in his rabbits by hæmorrhage and then set them to work on a treadmill. His animals died, and at autopsy multiple areas of necrosis were found scattered throughout the myocardium—a familiar finding in coronary obstruction in man. He obtained similar results if he reduced the oxygen-carrying capacity of the blood by inducing a state of carbon-monoxide poisoning, and thus the obvious fact that anoxæmia of the cardiac muscle is the determining cause of death in cardiac ischæmia received experimental confirmation.

Under some conditions coronary occlusion is a fatal event, but the organism is often in a position to

effect a remarkable degree of natural compensation, so that even successive attacks of coronary thrombosis may be survived and sometimes an astonishing degree of normal activity may be regained in the interval, sometimes years in extent, between the initial and the second attack. Natural compensation is especially favoured, as Sir Clifford Allbutt long ago pointed out, if the process of coronary obliteration is one of slow onset; but even in Chiari's famous case of embolus of the right coronary artery (one of the few *clear* records in the literature of coronary embolism as distinct from thrombosis) his patient survived this insult for two days, when a second embolism of the left coronary artery abruptly terminated his life.

Natural compensation for occlusion of the coronary tree may be effected in several ways. Although it seems quite possible that there may be subtle compensatory mechanisms of which we know nothing, the mechanism of at least some of them is clear, and the following possibilities for the provision of an alternative blood supply exist:—

1. Anastomoses between the right and left coronary arteries may come into action when one or other main trunk is occluded.

2. The Thebesian vessels may act as an additional source of cardiac nutrition.

3. The natural collateral channels which connect the coronary tree with the vasa vasorum of the great vessels may become more pronounced.

4. The heart may acquire a new and additional blood supply if it adheres to the parietal pericardium.

1. *Inter-coronary Anastomoses.*

The free communications between the branches of the right and left coronary arteries, which were first effectively demonstrated in the exquisite preparations of Spalteholz, probably constitute the most important compensatory mechanism in cardiac ischæmia. That mechanism is effective in diffuse obstruction of the tree (athero-sclerosis and arterio-sclerosis), and it must play an essential part when actual occlusion of one of the main trunks (right coronary, descending branch of the left coronary, or circumflex) occurs. At the same time occlusion of a main trunk, whether it is sudden or gradual, is followed by an infarct of the heart wall. An explanation of the apparent inconsistency between the anatomical researches of Spalteholz and the effect of coronary occlusion as seen in the experimental animal or the living patient is provided by the ingenious experiments of Crainicianu. Crainicianu perfused the coronary trees of human hearts shortly after death under carefully-controlled conditions of pressure and temperature. He was able to show that the total volume of fluid perfused in a given time could be modified by experimental ligature of various branches of the tree, and also that the volume flow in a given time was less in hearts that were the seat of coronary disease. As he very reasonably points out, this method of examination will reveal what may be termed "physiological" obstruction in the capillary bed which histological examination may fail to demonstrate.

The degree of natural compensation by this means in an acute case of coronary occlusion probably depends, as in cases of peripheral vascular occlusion,

on the restoration of an optimum blood-pressure, relaxation of any spasm in those portions of the coronary circuit still patent, and localization rather than extension of the thrombus; for an extending thrombosis will occlude side branches of the affected vessel and militate against the formation of a collateral circulation.

2. *The Thebesian Vessels.*

The Thebesian vessels are small channels which connect all four chambers of the heart with the venous and capillary bed of the coronary tree. Their morphology has been demonstrated in injection studies by Grant and Viko and by Wearn. The exact part played by these vessels in compensation for cardiac ischæmia is unknown, but there is some recent work which suggests that it may be an important one. Slater and Kornblum record a remarkable case of mitral stenosis complicated by bilateral coronary occlusion, in which good compensation was maintained at least for a time, and they suggest that the altered pressure relationship within the heart owing to the mitral lesion may have made the Thebesian circulation abnormally efficient. Leary and Wearn report two cases of syphilitic aortitis with bilateral coronary occlusion which seemed to have had good compensation, and suggest that in these patients the Thebesian vessels must have been of service. Nevertheless, these patients died of heart failure, and there is no pathological evidence to suggest that the Thebesian vessels can in any way replace the normal coronary circulation, although the possibility remains that they may assist in compensation for a defective circulation.

3. *The Natural Collateral Channels of the Coronary Tree.*

Minute arteries which connect the coronary arterial tree with the vasa vasorum of the aorta and the pulmonary artery were first demonstrated by Langer. He also found that material injected into the coronary tree could be recognized in the vessels of the mediastinum and the diaphragm, and even lying far out in the lung under the bronchial mucosa. An occasional and very interesting finding was the presence of a minute artery taking origin in the aorta some distance above the sinus of Valsalva and pursuing an independent course to ramify on the basal region of the heart. Langer's findings have been confirmed by more recent work, but few observations appear in the literature as to the state of these vessels in persons dead of cardiac ischæmia. Von Redwitz, however, noted in some of his exhaustive post-mortems the presence of a network of small vessels at the root of the aorta and pulmonary artery.

4. *The Formation of New Extra-Cardial Anastomoses.*

The heart can only acquire a new collateral blood supply if partial or complete destruction of the epicardium takes place, so that an adhesion may form between the heart and the parietal pericardium. This important mechanism is only available in those rare cases when the victim of coronary occlusion has previously suffered obliteration of his pericardial space as a result of an old pericarditis, or when following a coronary occlusion an actual infarct is produced with its base on the epicardial surface of the heart.

Examples of this extreme degree of natural

compensation are very rare, but since Sternberg first recorded the syndrome of pericarditis epistenocardica there have been other reports of angina complicated by pericarditis with a favourable immediate outcome. Sternberg's patient was a man of 48 who suffered a coronary thrombosis, and in whom a clinical diagnosis of pericarditis was made by auscultation. He made a good recovery, and returned to active life for two years before dying of heart failure. At autopsy a large cardiac aneurysm was found adherent to the parietal pericardium. Mönckeberg cites other similar instances. One of these, a case published by Fujinami, is very striking. Sir Clifford Allbutt recorded the case of a doctor who suffered a severe attack of angina pectoris, after which he was bedridden for some time, and during his illness pericardial friction was detected. He recovered and returned to active practice. The opposite picture was presented by two cases of cardiac aneurysm of which I had personal experience. So far as can be determined the site of vascular obstruction was the same as in the cases cited, but in neither case had pericardial adhesions formed. One patient died from progressive heart failure and the other from hæmo-pericardium following perforation of the aneurysm into the pericardial sac a few months after the initial attack.

It is true that this type of compensation is available only to a small number of cases of coronary thrombosis. White only found it present eight times in 62 cases, and in Parkinson's and Bedford's 83 autopsies on coronary occlusion there were 11 cases of pericarditis, and in 100 cases examined clinically pericardial friction was only heard in 7. On the other hand, in Coombs's

series of 148 cases of coronary thrombosis he detected pericardial friction on forty-two occasions; and although it was his opinion that the immediate mortality was higher in these cases, it would appear from his figures that the subsequent course of those patients who did survive was rather more favourable than in the other group. Of course, his period of observation had been short, and in view of the importance which this question has now assumed it would be of extreme interest to know the course run by his group of patients during the last five years.

Despite their comparative rarity, there is every indication of the practical importance of these adhesions when they are present. Wearn and his associates carried out injection studies on the human cadaver, and could demonstrate a vascular connection between the coronary tree and the parietal pericardium when adhesions were present. I was concerned in a case in which pericardectomy was carried out for *concretio cordis*. The patient died some three months later, and in the interval, although the mechanical relief afforded by the operation was demonstrated in a reduction of her ascites and venous pressure, an unusual type of cardiac irregularity had developed. After death histological examination showed scattered areas of necrosis and fibrosis in part of the auricular wall, from which the adherent pericardium had been stripped.

It is interesting to speculate on the relation of these natural reparative processes to the prognosis of the various types of cardiac ischæmia.

An established case of syphilitic aortitis should theoretically be of the greatest disadvantage, for here

intercoronary anastomoses can be of little service if the orifices of both vessels are occluded, endarteritis of the vasa vasorum of the aorta and pulmonary artery is likely to render them less efficient as collateral channels, the heart remains free in the pericardium, and therefore additional collaterals cannot reach it, and so the only mode of compensation remaining is a rather doubtful Thebesian supply.

The gradual development of diffuse atheroma of the coronary tree should enable compensation to be established through the natural collateral channels, but unless a frank coronary thrombosis occurs late in the disease an infarct cannot form, and there is no chance of the natural acquisition of a new blood supply.

THE TECHNIQUE OF CARDIO-OMENTOPEXY.

The following description illustrates one of the methods we have worked out at the Buckston Browne Farm Laboratory of the Royal College of Surgeons of England and in the Lambeth Cardio-vascular Clinic, by which the processes of natural compensation may be initiated and supplemented by operation.

After suitable premedication general anæsthesia is induced and maintained with the Tiegel-Henle apparatus, which supplies oxygen under positive pressure together with vaporized ether. With the patient on his back, the chest is entered through an incision along the fifth intercostal space extending from the midline to the anterior axillary line. The fifth and sixth costal cartilages are divided near the sternum after the manner of Kirschner and by

the use of a large Sauerbruch intercostal retractor the pericardium is exposed. The phrenic nerve is identified and crushed with a hæmostat, and once this has been done the pressure in the anæsthetic apparatus is reduced (from 10 to 6 cm. of water) and the table is tilted to the right. As a result of these manœuvres the left leaf of the diaphragm appears in the operation field, and after the insertion of two sutures the muscle is incised. The abdomen is then explored through the diaphragmatic incision; a suitable portion of the omentum is obtained and brought through into the chest. The wound in the diaphragm is then closed by suture. The table is brought back to its original position, the degree of inflation of the lung is again increased, and the heart, covered by the pericardium, is once more in view. With caution the pericardium is incised and the graft is attached to the surface of the heart and to the edges of the pericardium by suture with fine linen thread. Finally the chest wound is closed in layers in the usual way.

CASE HISTORY.

A missionary's widow, aged 65, had led a strenuous life for many years in high altitudes. Angina pectoris for twelve years: attacks had become more frequent and more severe, and she had been almost confined to bed for over eighteen months, being finally unable even to wash herself. (A sister had angina.) She was referred to the clinic by Dr. L. Lyne, of Hove, and was admitted on 1st October. Examination: very obese; heart enlarged to anterior axillary line; soft aortic systolic murmur and very short diastolic whiff; radiogram confirmed cardiac enlargement; B.P. 247/117; no œdema; electrocardiogram showed complete bundle-branch block with large amplitude of Q R S complexes in leads I and III.

After ten days' treatment with general massage, starch free diet, and administration of theamine and amytal, cardio-omentopexy was performed at Lambeth Hospital on 16th October, 1936, with the assistance of Dr. Mansell and Dr. Berry under general anæsthesia by Dr. Hasler. Aleuronat was injected into the pericardial sac and at the site of graft. At the end of operation the pulse-rate was 69, the B.P. 170/90, and the electrocardiogram showed no change. Recovery was interrupted by a paroxysm of auricular fibrillation, which began 30 hours after operation and ceased spontaneously 9½ hours later. There were two anginal attacks during the first fortnight and none subsequently. General massage was begun after five weeks, and she was allowed to wash herself. In six weeks the blood-pressure had returned to 240/112 and was causing symptoms. She is now getting up daily for one to two hours and has kept free of angina. On a balanced diet the blood-pressure has fallen to 210/120. Physical signs of pulmonary collapse have been present at the left base since operation. The electrocardiogram shows no change.

She was allowed gradually to increase her activities, and was eventually discharged to St. Benedict's Hospital on 3rd February, 1937. From the time that she was treated with five grains of quinidine sulphate daily there was only one more brief paroxysm of auricular fibrillation. Her progress at St. Benedict's Hospital was uninterrupted, and she was discharged from there on 18th March. When last seen on 23rd April she was complaining of no symptoms except painful feet. She was able to climb stairs and to go out to church, shopping, etc., and was quite free from anginal pain. She proposed to go home to Hove on 26th April. Her systolic blood-pressure was 220.

In the course of our operations we have made some incidental observations which may be of interest. It is, of course, no new thing for the surgeon to expose and operate on the human heart. Since Rehn demonstrated the possibility of operation for cardiac wounds in 1897

such interventions have become almost commonplace. Before the operation of cardio-omentopexy was devised, although I had exposed and operated on a very large number of animal hearts, my experience of cardiac surgery (as distinct from the surgery of the pericardium) in man had been limited to one or two interventions for stab-wounds, and the dramatic attendant circumstances left me little time for deliberate inspection. In any event the victims of cardiac wounds do not as a rule have diseased hearts.

During our operations we have had occasion to recognize one essential difference between hypertrophy and dilatation of the heart, for in dilatation the coronary vessels are unduly prominent, being forced out from the interventricular sulcus, and we now know that it is necessary to treat such a heart with special care. We have also seen the various types of pericardium—the tense sac over a true hypertrophy which is difficult to incise lest the heart itself be wounded, the slack pericardium over a heart of normal size, and the rather delicate pericardium enclosing a serous effusion. We have also had what is perhaps the unique experience of exposing the heart in a patient suffering from heart block, when we observed cardiac contractions proceed at the rate of 36.

We have also been struck by the greater vascularity of the structures which surround the heart in man as contrasted with the lower animals. The pericardium itself is often highly vascular, and the inferior sternopericardial ligament, insignificant both in the cadaver and in the experimental animal, has been a prominent and richly vascular structure in most of our patients. It is reasonable to suppose that man is under

a greater necessity to develop his defences against cardiac ischæmia than are the lower animals, and I have previously pointed out that cardio-omentopexy, as well as bringing a new blood supply into direct relationship with the ischæmic area and the coronary tree, serves to reinforce the normal collaterals in the mediastinum and to give them access to the heart.

CONCLUSION.

In the present state of knowledge it is impossible to lay down any rigid indications for surgical intervention in cardiac ischæmia. From a consideration of the pathology of the various cardiac disorders it is clear that ischæmia plays an important rôle in many and a dominant rôle in some, and in the Lambeth Clinic we have demonstrated that surgical intervention is practicable and relatively safe, even under rather unfavourable circumstances. Our patients have included a man of 72 and a bed-ridden woman of 65. We are not neglecting the obvious factor of arterial spasm in angina pectoris, but we maintain that spasm is only significant when coronary disease is present. In the laboratory we have paid considerable attention to the nervous factor in coronary obstruction—I am most grateful to Professor Leriche, of Strasbourg, for the personal explanation of his views—and in certain cases we are prepared for operative intervention on the autonomic nervous system.

The selection of patients for operation is in the hands of the medical staff of the Lambeth Cardio-vascular Clinic—Lord Dawson of Penn, Dr. Dan T. Davies, and Dr. H. E. Mansell. We have only operated on a relatively small proportion of the cases sent to us,

and in the present stage of the work we have felt it advisable to restrict our interventions to the most severe cases.

In one of his papers Coombs pleaded for the exact correlation of anatomical examination with the clinical findings. At Lambeth we are for the first time able to correlate our clinical findings with what the late Lord Moynihan so well described as the "pathology of the living," and while our researches are only at their beginning, and are in no sense comparable in volume or importance to the vast output which was Coombs's own contribution to cardiology, it may be that in some measure we shall reap where he and other of the great cardiologists have sown.

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SOME REFLECTIONS ON RESEARCH IN MEDICINE.*

BY

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LADIES AND GENTLEMEN, for my own sake and for the sake of medicine I hope you are not all Galens, for an intellect such as his was so commanding that eventually its unquestioned authority tended to become an obstacle to progress rather than to assist its advance.

I have chosen "Reflections on Research" for my subject, and shall from time to time illustrate it from the ancient history of rheumatism. But be under no mistake. I am not supposing or wishing that you should all become what are sometimes called "Researchers." A great part of my professional life was spent teaching general medicine to students with a view to the most important task of general practice. The great work of doctors is done in ordinary general practice, not in whole-time research; but it is, I think, a great advantage to preserve some of the characteristics of the research mind, whatever line you may take up. These prevent one from getting too much in a groove, and from becoming that rather dreadful person a

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self-made authority on a subject upon which the wisest doctors only know surprisingly little.

It must have struck you how strange it is that when there is a difficult case frequently an able man of many years' experience is baffled as much as you are yourselves: that is supposing you have escaped from that first evidence of ignorance which leads you when a clinical clerk of two months' standing to believe that you know more than the experienced. Even a resident may be a very trying individual with his air of importance, and I speak from a long experience of residents, mostly good, some moderate, a few definitely bad. When I analyse my bad ones they have been either lazy or have continually insisted upon teaching me. I say *continually*, for there is no sensible physician who cannot learn something from a younger mind.

There are very different ideas about research, and the word "genius" frequently crops up over this pursuit. I do not attempt to define genius. It is most commonly discovered, we know, after the individual is dead, but I will give you my idea of genius. A man watches a small boy blowing a fine soap bubble, and argues from this that the soapy medium forms the envelope of that bubble and that the heated air inside causes it to float. He takes a small paper bag, fills it with hot air, ties the neck and sees it rise in the air. He perseveres and makes a balloon 35 feet high, 110 feet in circumference, weighing 500 lbs., and demonstrates that it also will ascend in the air. Then he notices that before it is full it pulls so hard to ascend that it requires men and ropes to hold it *down*. Accordingly he argues it will

take something *up*, and eventually sees human beings riding through the air and has laid the foundation of aeronautics.

He has shown much more than "the infinite capacity for taking pains," at the best only one feature of genius. He has seen what we did not see, he has visualized what might possibly result from his observation, and turning neither to the right nor left has, step by step, rationally developed his discovery. Most geniuses are simple-minded, because every step of that epoch-making discovery was simple when you come to think of it to-day and to look back on it.

Research in medicine is vastly more difficult because of the great complexity of human life and disease, but the general principles are the same—some little secret missed for years suddenly explained, some scattered areas of knowledge drifting along by themselves suddenly linked together by a penetrating mind, some new discovery not directly connected with medicine suddenly recognized as a starting-point for a new medical development.

Rheumatism was thought by the ancients to be a peccant humour or rheum spreading down from the brain, but Radulfe in the thirteenth century focused his attention on the joints and muscles and spoke of "gout," which Aretæus in the second century had with some truth observed none but the gods understood. The peccant humour or rheum had now, you see, become something wrong with the joints. Then Ballonius in the seventeenth century noticed that not all arthritis was gouty, and called these other acute forms "rheumatism."

Then old bones were dug up which showed that arthritis was not always acute but was sometimes very chronic, and this led to Sydenham trying to evade this difficulty by calling this chronic form "scorbutical rheumatism." Next Störck started a new line of thought, for by post-mortem examinations he showed in 1762 that rheumatism was not only an arthritis but that there were visceral complications. Then during the French Revolution Beauvais recognized what we call rheumatoid arthritis from among the more chronic forms of arthritis.

In 1789 Edward Jenner—a general practitioner, mark you — not content only with vaccination, recorded heart disease and rheumatism. Then came the genius of Lænnec with the stethoscope in 1819, and in 1836 the great French physician Bouillard, by establishing the association of acute carditis with rheumatism, left in continental literature the term Bouillard's disease for acute rheumatism of childhood.

Sydenham, writing on chorea, and a little earlier Stoll in 1789, began to show us its association with rheumatism, and Begbie in 1847 maintained it was not due to heart disease, but with heart disease was also caused by rheumatism.

Another French genius arrived named Pasteur, and for nearly forty years the idea that some rheumatism, especially children's rheumatism, might be due to infection was being worked at all over the world. Yet do not think we are more than on the fringe of understanding "rheumatism": indeed I sometimes think the ancient "rheum" or "peccant humour" has ceased flowing down from the brain of

the rheumatic, and is now flowing down from the brains of all of us who are fighting over what is meant by rheumatism and what are its causes.

In spite of this pathetic conclusion, I cannot help feeling that all of you who have listened to these stories of the air balloon and of rheumatism must feel a sympathetic chord has been touched with our modern literature, the Penguin books, price 6d., in which you trace the activities of the detective or a rival amateur genius discovering the murderer.

When you are studying medicine to pass examinations — an absolute necessity — you are naturally concerned with what are looked upon at the moment as facts. You must have facts to achieve success in an examination, and you must pass examinations, but a fact is the end of its research. When I say a to-and-fro murmur heard over the aortic cartilage is evidence of aortic regurgitation, and prove it to you by a post-mortem examination, the research on that particular point is at an end, for it has become a fact. The "cram" books on medicine—mind, I do not decry them—largely consist in a collection of bottled facts, and one great objection to repeated examinations is the danger that your mind is deadened by learning facts, that is you are continually reaching full stops.

Perpetual teaching, or "spoon feeding" as it is called, from the earliest moments in the wards, does not assist the research spirit. Now if you blunder through the examination of a case and present your view of it to me, naturally enough I might say I think you have missed the point here, this is the point you want. But you have, nevertheless,

undertaken a research, and like everyone beginning to research and even ending research you may have missed the essential, but you have strengthened your intelligence, not dulled it or kept it stationary.

There is a curious idea that someone who drifts into a laboratory to research is a superior being. He may or may not be. He may carry on some work already outlined but needing to be studied in more detail. That is good work, but it is not superior to the work of someone in the wards confirming some new clinical observation already made but requiring more confirmation. This is often called "hack work." I don't call it hack work, but useful work, though not mysterious or marvellous work. This, then, is no superior being because he is in a laboratory, he is not more marvellous than his friend the clinician he laughs at.

It is clearly, then, most important that we recognize that there is clinical research and laboratory research, and post-mortem evidence too when that is needed to keep us steady. There is no place on either side for antagonism. It must be remembered that clinical research may anticipate laboratory research, although the exact explanation of the clinical observation may have to await the laboratory investigator.

I knew the great children's physician, Dr. Cheadle, very well, and he told me that as a result of his travels in Canada he had seen and learnt much about scurvy in adults, and that on returning to England he found doctors terribly puzzled over a condition in infants brought about by patent foods. No one knew how to treat it or what it really was in nature. He from his observations and research into the scurvy of adults

at once realized it to be scurvy in infancy, and he cured it by fresh foods.

He insisted that there was a lack of something which he called the antiscorbutic element in the patent foods, because he had studied adult scurvy and its causation. Now you all recognize that element as Vitamin C, but many infants had been saved before you knew this or I knew it, and one of the duties of a doctor is to save life, even if he cannot give the name Vitamin C.

The reverse, of course, occurs. I have only to mention insulin and many other instances will occur to you.

I am putting aside for simplicity's sake any question of the financial side of our subject, though I would remind you that the great investigators have often worked in very small laboratories, and that a magnificent laboratory does not always mean good work, though it is a great asset to good work.

It is useless to lay down laws for the born investigator. He or she stands apart from us, with that curious gift of seeing something that seems new; that outstanding patience against failure or derision, because he knows that it is something new, and that concentration on the goal ahead. He may not succeed or he may be wrong, but he leaves a track of some kind which is of value, and by his mental power trains others who may surpass him in results. Such minds are invariably stimulating in the boldness of their outlook and tenacity of purpose, but they are minds which obey their own laws.

Now when the laboratory investigator, as a research worker, begins to scoff at and deride the clinician he

is in a bad way. I have been a pathologist, a bacteriologist, and a clinician in my time, and I have worked shoulder to shoulder with each type, though I became a clinician eventually because I loved the human side. I admire all types, but when a vaccine specialist living in a laboratory undertakes to cure a case of malignant endocarditis, and after his injections the temperature slowly falls and the patient dies, and he does not come to the post-mortem examination; further, when he is content to say if he had commenced the treatment sooner the patient would have lived, I think badly of him. Why? Because he did not know what the clinician knows, that the fall in temperature was the sign that the patient's resistance was exhausted, and not of the partial success of a vaccine. If he had come to the autopsy he would have seen the impossibility of his claim, but as it is he returns to his laboratory believing in a partial success, and he is in a bad way.

In this case you see two instances of research, the laboratory research which I do not criticize, and the clinical research which led the physician to recognize from his knowledge of malignant endocarditis and from his knowledge of his patient that the fall of temperature was premonitory to death. The weak point was the ultimate failure in research of the laboratory investigator in not facing the findings of the post-mortem examination. The physician could also have told him that he had seen vaccines used at the earliest moment of detection of malignant endocarditis and had even then seen them fail.

If, however, a physician denied the possibility that at some future time a vaccine might be discovered

which would be successful, he would be speaking without the requisite knowledge of the possibilities of laboratory research, and would be also moving on bad lines, because he could not possibly know the future of laboratory research.

Take another case. A physician has under his care a case of anæmia which he *assumes* can be cured with massive doses of iron, but the case does not improve. He is persuaded to call in from the laboratory an expert upon examination of the blood, who at once points out that it is a pernicious anæmia. Here the physician has failed in his research mind, and has assumed that he knew from his own experience something that the laboratory research worker could prove at once to be an erroneous assumption from his laboratory researches.

To recapitulate at this point. I have been laying stress on the belief that the essentials of the research mind are to be found in wards, at the bedside, as well as in laboratories; that the various research minds should try to keep in touch with the main object—the advancement of medicine—and not become aloof from one another; and that the outstanding research mind is one which makes its own laws and is not guided by ours; and, lastly, that such minds have a stimulating effect upon us by their peculiar quality and power to make us think.

You may ask: How can the research mind help in every-day work? It can help from the first. For instance, in reminding you that you are not studying a pneumonia, but a case of pneumonia, a human being suffering from pneumonia. Then you begin to realize the truth, for you find yourself inquiring in your mind,

why did this case do well and that one do badly ? You are led to research away from the pneumonia into the type of pneumonia, into the influence of age, of alcoholism, of overwork and under-nourishment and so on. It is this habit of mind that results, after the necessary experience brought alone by time, in making the competent doctor, the practitioner who becomes thoroughly trusted because his judgement is sound. Year after year, unconsciously perhaps, he has been researching not only into pneumonia, but into how pneumonia and other illnesses may affect this or that individual.

I could see the type of mind when I was examining. When, for example, I asked some question upon treatment, and the answer came, "If I had seen this case earlier I should have advised immediate operation, but I am not certain that now the risk will not be too great." The particular condition under consideration was the same from the first, but the examinee had recognized that the human being had altered : he had become too weak, or too old, or some complication had arisen making the issue doubtful. In this answer I recognized the research mind. There is no doubt that when a student the rather wearisome undertaking of noting down each day some curious point, some interesting comment, or some unexpected happening about one's cases assists the research mind. When qualified and in practice you may laugh over your old notes as I have over mine, but they served their purpose.

We must realize that the research mind is to some extent adventurous and takes the risks of adventure, and to me it has seemed that when a particular

physician asks questions of students that those who keep well in the back row to avoid answering them lose thereby.

You may be quite sure of this. If you eventually do some research, so often called original—but so rarely as you will be surprised to find actually original—you will have to face up to criticism and to cultivate a placid, I don't say a pacific, mind to carry you along. If the work is important and you believe sound certainly you must defend it, but if from studentship you have feared criticism and making some mistakes you will not easily keep your equanimity later, and you may even turn tail.

There is much to be learnt, of course, in laboratory training just as there is in surgery—much accuracy, and in some cases much knowledge of handling instruments, and so on, before the actual investigation can be safely undertaken. Some minds naturally enough prefer the wider, more philosophical nature of medicine, or the practical details of preventive medicine, but they are not safe from research.

You never know, in whatever branch of the profession you are, whether opportunities may not arise which put you into the position of making some useful contribution. This leads me to another consideration, the art of putting your work into published form. This is also a type of research. It is a research into the minds of those whom you think will read your work. Do not suppose I am going to advise you to study my writings for this purpose. I have written three books, numerous lectures and a dreadful number of medical articles, and I was told recently by the candid friend and the gentle critic that

I wrote "journalese." I am by nature not easily moved, and love the humorous side of things, and my retort was an easy one. It was: "When you have three books published and are asked for—I do not mean send—reprints of your lectures come and see me again and talk it over."

There are great pitfalls in writing. One is, to suppose the reader knows the subject as well as you do yourself. Another to use a number of long scientific words when only a few are necessary. Another to suppose that complicated graphs in great numbers can appeal to a reader who is not acquainted with complicated diagrams. Another to presume that everyone who may not agree with your new and perhaps debatable conclusions is a fool. Even if I am a fool I do not like to feel it, and the enemy bides his time to strike back.

A summary at the end of your paper should avoid the obvious. Such as this (No. 1): "We have shown that rheumatism is a common disease." We all know that already. Or an ending such as this (No. 2): "We have investigated x number of cases for such and such a point, but it will require many more before we can decide upon the real interpretation." (No. 3): "We publish these results as a preliminary step." Why publish them if you want many more cases to prove the meaning of your point? Why not wait and not trouble to inform the medical profession rheumatism is a common disease. I am very suspicious of a preliminary report, because so often one never hears the sequel. It reminds me of showing a difficult clinical case you cannot diagnose and never reporting later the fate of that case. Lastly remember: "What

is written is written." One often regrets this. Don't be surprised if, in spite of accuracy, you may find your view not understood, or garbled. Be patient.

There is another aspect of research, an interesting one. This is the tendency to specialization, and probably in the end complete specialization.

It is a clear impossibility to investigate everything in medicine, but I do think this, that we should try to realize that when we take up special lines of investigation we narrow our outlook on human illness, and may lose a sense of proportion. We should be on guard lest we become fanatics. There are plenty of instances of able people who have found out a half-truth—and it may be a valuable half-truth—and have then surrendered their research mind to fanaticism. More and more is to be explained by this half-truth, until at last everything is to be explained. Such able minds may become actually deranged. Doctors who have to teach students are much protected against this, for the student requires varied teaching. Again, those who can listen to other views are much protected. You can quite easily become a fanatic over rheumatism. You can become a fanatic over the bacteriology, the endocrines, the diet, the gold as a drug or as a reward, the local focus, the rheumatic diathesis, bee venom, the climate, the sympathetic system and allergy.

How can you prevent this danger? I think by not shutting yourself up in the chamber in which your particular idea is living, but by listening to the words of others living in other chambers, perhaps they also inclined to be fanatics. You say to me, "Malfunction of the endocrines explains all rheumatism." And I ask, "Does a child aged three with Still's disease or

juvenile rheumatoid arthritis suffer from endocrine malfunction? What is your proof of that?" I say to you, "All rheumatism is due to an infection." You say to me, "What is rheumatism?" Even as Pilate said, "What is truth?" If I am honest I say, "I don't really know." And you reply, "How, then, do you know all rheumatism is due to an infection?"

Signs of fanaticism appear sometimes early in a student's career, and I don't like to see it, because it grows with age. Fanatics, it is true, have done wonders in great causes, but I think in the complicated study of human disease it is more frequently the mind that is balanced, yet has some great truth to make known, that is the more often the one that obtains far-reaching results, because it knows that this truth cannot be forced upon unwilling ears, but must wait for results which bring conviction. Lister held firmly to the great principle of antisepsis, and he won his way by continuous efforts to show that the results justified his faith, not as a fanatic, but as a man who saw that the truth must justify itself and not be thrust against the unwilling, thereby increasing resistance to its acceptance.

One of the great difficulties in research is the doubt as to whether a result is of any use. We must admit that a great deal of research seems to be lost, but we have also to admit that we never know when something apparently lost and useless may not be found to be of value. Many a man has suffered the fate during life of finding all his work apparently useless. Later, when he is dead, some change in thought has occurred and the true value of his work is suddenly discovered. I do not think anyone can guard against this. It is the fate that

comes to pioneers in all departments of life, and the only consolations are the pleasure and interest of the work to the individual and the grimmer joy of combating the adversary.

Some of you may not realize how long a time it takes to get a grasp of the subject you wish to investigate. Rheumatism, for example, requires at least two years' study before you can grasp the difficulties and the problems. Yet there is a tendency to give short time aids to research on such a subject to a beginner. It seems to me that the time is up before he has had a chance to know the outlines of the subject, and yet he is obliged, perhaps, to produce some result, and produces through no real fault a very imperfect one. Then, maybe, he considers he has spent enough of his life on this investigation and he gives it up. A good deal of money is easily wasted upon research, as you can guess. It is inevitable.

It is a very interesting point for the philosopher to consider whether ground which has been already explored and supposed to have yielded all its usefulness should be again explored by a beginner. If it is very important ground I think yes, for though you may arrive at the same results, you may see things from a different angle to the forerunner, and as a result side tracks be started from the main track.

Some things are so well established, so certain, and so thoroughly recognized that continual repetition is not helpful. They have become facts, and most important ones, but not requiring continual repetition, unless there are some side tracks to be learnt from them. There are limits to repetition, especially when there is so much that is new to discover.

We cannot escape from the fact that some minds are not meant for research in laboratories, though the individuals may believe they have this flair. Soon they get into a groove and lose that "vision" which is required, and as you will know when you get to middle age, though some outstanding minds do not weaken in vision, most, like the singer, find themselves driven to sing the old songs that were once attractive but are not new. The mind of a child does not remain with most of us, but it is the mind of a child that is so original, because unfettered by custom it sees very clearly the essential.

SPINAL ANÆSTHESIA*

BY

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THE value and importance of spinal anæsthesia is now well established. The object of this communication is to discuss the indications and limitations of this procedure. The few special requisites I described in detail in the *British Medical Journal* in 1931.[1] I have, however, been led to radical alterations in dosage and in method of distributing the anæsthetic, spinocain.

The aseptic technique is followed fully as in ordinary operations. Meningitis has not occurred in this series, but there have been a few cases of severe headache. These may last for a week, and one had mild pyrexia. I suppose this is a simple inflammatory response. Failure to tap the theca with the patient of whatever age in the lateral position is almost unknown. Undeviating adherence to the exact midline is the path to sure and swift puncture. Usually the point of the needle needs a few degrees' tilt in a cephalic direction. 0·5 c.cm. of spinocain is used between the third and fourth lumbar spines for the peno-scrotal and coccygeal areas, and the table immediately sloped to 20° Trendelenberg position,

* A paper read at a meeting of the Society on Wednesday, 13th January, 1937.

the patient being turned on to his back during the two minutes' induction. For operations up to and including the knee 1 c.cm. between the second and third lumbar spines is used. As hernial operations may involve dragging on the parieto-visceral peritoneum a full abdominal anæsthesia is probably best, as for other forms of laparotomy. The space between the first and second lumbar spines is chosen, the table inclined in the reverse Trendelenberg position until the *spine* makes an angle of 5° with the horizontal and 1·35 c.cm. slowly injected. It will rightly be inferred that admixture of cerebro-spinal fluid is not essential for successful anæsthesia; but an equal part of it is desirable. It warms the cold spinocain and prevents a strong solution reaching nerves at the site of injection. Induction takes about four minutes, but in rare cases may take fifteen to twenty-five minutes. After the lapse of a minute the table is levelled, while at two minutes a head-down slope of 5° to 10° is assumed, the patient gently rolled over on to the back and one pillow permitted for the head. Renal cases only differ in remaining in the lateral position for the operation. 1·3 c.cm. is the usual dose of spinocain, but up to 1·4 c.cm. is sometimes given according to the level of operation and type of patient. Though fluid often drips from the needle after puncture, it sometimes happens that none can be drawn into the syringe. In such cases the syringe is detached, and if confirmatory drops still flow, injection may be made with confidence. In about one per cent. of patients anæsthesia is perfect for the parietal incision but not for the subjacent viscera. This disappointing fact is due presumably to sensory function in the vago-sympathetic. Novocain infiltration of the mesentery makes good the defect in some cases, and it is a useful

routine adjunct in the upper abdomen. In a further one per cent. even somatic anæsthesia fails above the lower abdomen. This rare deficiency is the price paid for a "safety-first" policy and insurance against undue ascent of anæsthesia. Experience in the use of this drug leads to the conclusion that nerves in different patients vary in grade between gross examples of resistance to novocain on the one hand to marked susceptibility on the other. To this factor rather than to errors in technique must be attributed occasional variation in results in skilful hands. A comparable phenomenon of the central nervous system is met with in the action of ether or chloroform, to which some patients yield but stubbornly, and indeed may never resign themselves properly during the whole of a major operation.

The duration of anæsthesia averages sixty to seventy minutes. I once noticed returning sensibility at thirty-five minutes in a case of cholecystectomy, but on many occasions anæsthesia has persisted for two hours or longer.

The patient is returned to bed with the foot raised on six-inch blocks for an hour, and special watch is kept where, owing to a short operation, the blood-pressure is not yet normal.

The anæsthetic agent is injected at one spot in the theca. Its spread thence depends on diffusion and that, in turn, partly on dosage. Other factors are at work which complicate its distribution. First, nerve tissue has an absorptive action on novocain and fixes it. Secondly, the gliadin included in the compound called spinocain retards the process of diffusion. Finally, alcohol (14·5 per cent.) in the solution renders it lighter than cerebrospinal fluid, but this influence is inconstant in degree because the density of the *latter*

is slightly variable. However, cerebrospinal fluid is always sufficiently heavier for the initial trend of the injection to be upwards on entering a sloping theca. This is the rationale for the foregoing instructions as to the inclination of the spine during administration and the varied level of interspinous spaces chosen for puncture. When the drug ascends beyond a certain level the anæsthesia is good but danger is nigh. This was my early experience, and though no deaths occurred, was daunting enough to deter further efforts, but the improved method subsequently introduced by Pitkin inspired me to renewed trial.

CASES OPERATED ON UNDER SPINAL ANÆSTHESIA (SPINOCAIN).

STATISTICAL SUMMARY TO 30TH JUNE, 1936.

UPPER ABDOMEN:	
Stomach, duodenum, jejunum (of which 13 were partial gastrectomies)	87
Gall-bladder	60
Spleen	3
Kidney and ureter	48
LOWER ABDOMEN:	
Colon	90
Abdomino-perineal excision of rectum	7
Acute intestinal obstruction (excluding hernia)	43
Appendix	170
Hernia (including Gallie's operation and strangulated hernia)	133
Laparotomy	67
External genitalia	37
Bladder	31
Prostatectomy	136
SACRAL AREA:	
Perineal excision of rectum	7
Anal, peri-anal, and coccygectomy	58
Cystoscopic procedures	360

LOWER LIMB :	
(Including fractures, dislocations, deranged knees, osteomyelitis, etc.)	192
TOTAL (of which 48 were children under 12 years)	1,529

DANGERS AND DRAWBACKS.

Dangers.—The chief is shock. This is partly due to the nervous susceptibility of the subject, but is mainly due to lowered blood-pressure. Its degree is proportional to the extent of paralysis of those fibres in the spinal nerves destined for the sympathetic system and so for vaso-constrictor muscles. The rise of temperature in the legs is the obvious result of this flushing. These nerve fibres derive from the spinal segments from the second dorsal to the second lumbar. As abdominal innervation extends as high as the sixth dorsal segment, the drug must reach at least that level, and for complete confidence a few segments higher. In actual practice anæsthesia usually ends about the nipple level. I have not known miosis nor palsy in the hands using the doses here advocated, and it is rare to hear patients complain of any paræsthesia in the fingers. Not only does restricting the spread of the drug beyond the dorsal region guard against excessive sympathetic palsy, but it protects respiratory movements by preserving intact the functions of the phrenic nerve.

The ideal is to steer a middle course between falling blood-pressure and inadequate anæsthesia. Of the two obviously the former is to be avoided at all costs. Hence the dose of spinocain has been lowered till the minimum necessary for achieving anæsthesia was reached. So near the minimum is it that in a few per cent. it is inadequate. In compensation for this the method insures against

fatalities. Even so, any threats of failing pulse must be carefully looked for as an abdominal operation proceeds, and the following precautions should be taken :—

PRECAUTIONS AGAINST SHOCK.

1. Record the blood-pressure prior to the operation and avoid spinal anæsthesia if it is sub-normal, e.g. with internal hæmorrhage of ruptured spleen, liver or ectopic gestation. Cogent arguments in its favour would be needed before using the method in patients with a systolic pressure below 110 mm. Hg. In the case of children reliance is placed on the resilience of the circulatory mechanism, and the blood-pressure is not tested.

2. Premedication with pressor substances, such as ephedrine, is a routine procedure.

3. Repeated vomiting during operation, exhaustion and air hunger are to be regarded as possible indications of serious fall in systolic pressure. They are of less significance in younger patients. Have in readiness an emergency syringe for intravenous injection containing 1 c.cm. of 1 in 1,000 adrenalin. This is given if the pulse is nearing imperceptibility at the wrist. The surgeon may finger the ilio-femoral artery. About a minute after adrenalin enters the vein the most dramatic invigoration of the circulation ensues. The pulse bounds, colour replaces pallor, and the wound bleeds. The operation is then completed. On one occasion this procedure failed, but the pulse returned strongly after intracardiac injection of adrenalin combined with massage of the heart through the diaphragm. Adrenalin is most magical among medicines. For milder degrees of prostration a subcutaneous dose

suffices. Obviously a full Trendelenberg position and artificial respiration may be useful adjuncts.

4. Before the incision, in a case where spinal anæsthesia is strongly indicated but liability to undue shock is suspected, the institution of continuous intravenous saline would be an added safeguard.

5. Restrict the use of narcotics and general anæsthetics. When a serious degree of shock and lowered vitality is present the aspect of the conscious patient undergoes obvious changes. This valuable warning gives the opportunity for deliberate use of the restorative measures already referred to and kept in readiness. On the other hand, when spinal is combined with any other form of general anæsthetic narcosis is apt to mask the developing stages of such deterioration. The signals of distress are absent, until with alarming suddenness a profoundly grave state declares itself and demands instant resuscitatory measures. Such occasions, fortunately, are rare but memorable. Therefore, where we are working with frail subjects it is wise to keep the anæsthesia as simple as possible, and only employ additional "general" if the spinal proves inadequate.

Since the case (carcinoma coli) reported in 1931[2] to the end of the period covered by these statistics I have had no fatality, save once where spinal and nitrous oxide anæsthesia were combined. The autopsy on this man of 63 showed extreme flabbiness of the heart muscle and gross dilatation of the auriculo-ventricular rings. The many features that go to compose the circulatory picture make it complex. There is a wide range of blood-pressure, e.g. a successful prostatectomy in a plethoric man of 70 years who had blood-pressure of 240 mm. Hg., the varying resilience of the vessels and the subtle changes in the

myocardium. An infallible pre-operative assessment of cardio-vascular functions is still a remote ideal, and the only way to escape fatality from this source is to err on the safe side in regard to dosage.

Novocain sensitivity and the reverse obviously play an important part. A slightly sub-average dose might create a profound effect on the circulation in the susceptible subject, as well as giving full anæsthesia. Per contra, in the resistant even the average dose might barely cover the requisite area and would scarcely make an impression on the pulse.

By observing the spread of anæsthesia in the conscious after spinal injection and adjusting the tilt of the table accordingly, one might hope that the spread of the drug would be controllable in accordance with the particular response of each individual. Unfortunately the intrathecal diffusion and fixation is too rapid.

In further proof of the assertion that the doses recommended are minimal is the fact that occasionally during laparatomy the legs of the patient move.

A young man lay contented, when I extended the incision for radical orchidectomy to the rib margin. Suddenly, as the cord was lifted near the internal inguinal ring, he felt two or three flashes of pain in the rectum. This was during traction on the unparalysed prerectal end of the vas deferens. Such phenomena are explained by the fact that the bulk of the injection is so small that it does not reach the lowest spinal nerves.

It is evident that some control of caudal as well as cephalic spread is possible, concurrently with full anæsthesia of the intermediate spinal nerves. This "zonal" anæsthesia may be the ideal for the supra-pelvic operations. Of course, where the surgeon expects his manipulations to transgress the pelvis, even if only for a moment or two during exploration,

the patient needs the safeguard of a few whiffs of general anæsthetic.

CONTRA-INDICATIONS.

Patients with sub-normal blood-pressure and the acutely exsanguinated are ill-fitted to cope with the added depression of dorsal spinal anæsthesia, while the chronic asthmatic or emphysematous chest has so reduced a respiratory exchange that I have proved it is dangerous to deprive such of intercostal movement, and local or general anæsthesia should be used. Obviously unfavourable is the poor surgical risk, like an old patient of mine, who died under spinal anæsthesia since the statistics for this paper were compiled. This is his story:

"E.R.D. in the summer of 1934, when 63, healed well from cholecystostomy for stones and subsequent choledochotomy for cure of biliary fistula. Spinal anæsthesia was successful for both. By 1936 he had four "strokes," and on 27th November, 1936, a third laparotomy for apparent acute biliary trouble. Spinal anæsthesia was used, but he died during the operation, which disclosed nothing beyond free fluid and adhesions. Autopsy gave the clue to this tragedy. In the left ventricle was an old infarct and in its cavity a large organized thrombus. Shrivelled infarcts scarred the spleen, and tough cirrhosis the liver, while the cortex of the kidneys had almost disappeared with interstitial nephritis."

In view of such findings the result might well have been the same under general anæsthesia.

Another type emerges if a study is made of those who have given anxiety on the table. Their chances of, at any rate immediate, survival are likely to be greater under an alternative to spinal anæsthesia. I mean the chronic invalid whose main alimentary or urinary passages have long been fouled by growths, especially fungating ones, or sepsis. Their reserves have been sapped, their powers of resilience are in

abeyance, and they come to operation with heart and other tissues degenerated by toxæmia and secondary anæmia and with their metabolism torpid. If collapse or worse occur on the table after a skilfully administered spinal anæsthetic, then their victims will be among such subjects.

It behoves us to be convinced that the advantages justify the slightly added risk of spinal anæsthesia before employing it in this class of patient. Favourably contrasting with these is the acute abdominal case, whether arising in the healthy or complicating chronic illness, for the sudden assault on their organisms has roused their forces of resistance to full vigour. They are well able to contend with the transient depressive influence of the spinal anæsthetic. This favourable reactionary period is followed all too soon by rapid deterioration, and though still acutely ill, the patient is leaving the level of vigour where he can safely avail himself of the advantages offered by this method. For instance, once the acute intestinal obstruction case has passed the zenith of reaction he will need very careful piloting if he has a spinal anæsthetic. Often his needs will be better met by a local or skilfully administered general anæsthetic. Spinal anæsthesia usefully reminds us of the need for promptitude in dealing with the acute abdomen.

Again, sufferers from gall-stones, who oftener come to operation "in the cold," have fared well, as shown by preceding detailed statistics for two reasons:—

1. Periods of good nutrition intervene between their intermittent attacks.

2. The main alimentary thoroughfare is not (directly) involved.

Of the peptic ulcer class it is notable that younger patients figure largely, the disease exerts a baleful

influence less continuously, and degenerative processes in the body are correspondingly less advanced. The subperitoneal site of operation shields the prostate patient from the indirect effects of surgical manipulations and he is often in fair general health.

Drawbacks.—In the foregoing is set forth how to avoid and to treat shock, the chief difficulty of spinal anæsthesia. Slighter drawbacks call for mention. Occasionally the patient complains of paræsthesia in the lower limbs, but this ceases after a few minutes. Later itching occurs in a few cases and may annoy the patient longer. What troubles the theatre staff more than the patient is the occasional evacuation of fæces on the table. It happens in a few cases, mainly emergencies with stagnant colons, and is due to paralysis of the sympathetic innervation of the bowel and the unopposed activity of the vagus. Where it is expected suitably placed pads will control the outflow.

Headache is uncommon, but as with other rare phenomena in medicine, two or three cases are apt to appear within a short period, separated by an interval so long that one forgets the existence of it. In the hope of minimizing this trouble a strict maintenance of the recumbent position is enjoined during the day following anæsthesia, but the effects of posture in this regard are questionable. Complaint of headache is almost unheard of from out-patient cystoscopy cases. Yet after a few hours' recumbency they leave hospital as ambulatory cases. Palsy of the sixth cranial nerve lasted for three months in a case reported in my first series. No other paralysis has occurred save temporary, almost total, deafness. This was in a man, H.G., aged 53 years, who on 5th October, 1935, came to operation desperately ill with

late intestinal obstruction due to a "band." After several weeks hearing returned.

Backache due to trauma to the inter-spinous ligaments from the needle is rare with skilful puncture and passes off.

THE DEBATABLE TERRITORY OF THE UPPER ABDOMEN.

From what I have written it may rightly be inferred that in the lower abdomen spinal anæsthesia is sound practice. In the area presided over by the lumbo-sacral nerves it surpasses any other method for routine purposes. In the upper abdomen we reach a place of dissension. The peculiar difficulties in the upper abdomen are the unmitigated functions of the vagus and phrenic nerves, which are apt to make the patient grizzle and cause the surgeon concern. Inevitably a little pulling occurs on the stomach and liver, which is liable to provoke resentment or nausea, while movements transmitted through the diaphragm to thoracic contents may be distressing and make the patient feel ill. This hindrance is not insuperable, but the fact that the remedy is not a simple one partly explains why spinal anæsthesia is less popular for operations in the upper abdomen than in the lower. Time has to be given for deliberate judgment on each case, and one of several adjuvants invoked. It might be thought that what is wanted to silence the troubles of this unparalysed phrenico-vagal territory is to force the ascent of spinocain, either by increased slope of the spine or greater doses, so high as to catch these nerves at their origin. It would be sheer folly to treat the problem so, since with the spinal palsy reaching no higher than the fourth dorsal the maximum permissible fall of blood-pressure may ensue. To press the drug a little

because of occasional failure of upper abdominal palsy is fallacious and might even be fatal.

My first anxiety was to make spinal anæsthesia safe, and having practised it without any complicating factor of pre- or inter-medication I am in a position to judge its share in regard to any deterioration of the patient's state during an operation. To such a safe dose it is helpful, though not always essential, to add a routine infiltration of 1 per cent. novocain into the lesser omentum. This will be carried well round the cardiac end of the stomach in gastric cases and soaks up to the portal fissure in gall-stone operations. The patient is thus largely protected from phrenico-vagal irritation, and in many cases may go through the operation without further medication. Often more is needed, especially in allaying the apprehensions of women; but the consideration of this is left to a subsequent stage, while here the advantages of spinal anæsthesia in this sphere are discussed.

GASTRO-DUODENAL AND BILIARY SURGERY.

Sufferers from chronic gastro-duodenal ulcer or cancer of the stomach are apt to be toxic, pale and chronic invalids. The operations required for their relief are formidable. Any doubts of this are dispelled by the mortality rate recently published by Tidy.[3] That the general anæsthetic has much to do with the disasters is suggested by the various alternatives to it that have been tried of late. Among these are splanchnic and, most recently, wholly local anæsthesia as advocated by Finsterer. Spinal anæsthesia confers benefits on patients whose liver, kidney, cardiac or respiratory functions are at low ebb. The vital organs are spared the disadvantages of super-added intoxication,[4] and the surgeon gains complete relaxation,

that is, maximum access with minimum trauma, and welcome stillness. It is rapidly administered, and avoids the sodden state of the parietal tissues which at times is a drawback of local infiltration. Before dismissing such an ally, therefore, the doctor wants to be sure of his reasons.

Need the surgeon forbid the patient the advantages of spinal anæsthesia in gastric operations because it is risky? Among my own cases (from January, 1931, onwards), many of which were acute perforations and partial gastrectomies, there has been no fatality at operation. However, where local anæsthesia is applicable it may be more ideal, is safe, and gives similar ease of access; but the more tedious nature of the method and the acutely inflamed intra-peritoneal state make local anæsthesia difficult for perforated ulcers.

The other main sphere of upper abdominal work is biliary surgery. In these, as in gastric cases, the surgeon is often called upon to perform a major operation on a toxic subject. The myocardial and respiratory functions are apt to be defective, while the peculiar dangers of hepatic deficiency and jaundiced tissues are frequent accompaniments. It is in such subjects that an operation renowned as dark, dangerous and difficult is wont to be needed. Naturally surgeons welcome a method which spares such patients the added strain which general anæsthesia throws on their impaired metabolism. Spinal anæsthesia affords this boon, and at the same time easier access to the bile-ducts and subdued respiratory movements when working in the depths. Usually local infiltration is needed around the ducts, and often inhalations of general anæsthetic help the nervous subject during deep manipulations. Here spinal anæsthesia converts strenuous toil into smooth achievement.

Two leading surgeons, desirous of improving on general anæsthesia, tried it for gall-stones. Both forsook it, they told me, because of deaths on the table. It is possible that these disasters were due to improper administration and were not inevitable sequelæ of spinal anæsthesia. I quote from my own figures, drawing attention to the average age of the patients.

TABLE II.

Biliary Operations.

	Total Nos.	C.B. Duct Obstn. present in		Average Age.	Deaths.	
To 30.6.36	62	11	17·7%	56	5	8·1%
From 30.6.36 To 37	16	3	18·75%	55·25	0	0%
	78	14	18%	55·8	5	6·4%

Most were operated on with purely spinal anæsthesia, not because they were good surgical risks, but rather the reverse. Also, I have added to the table the cases subsequent to 30th June, 1936, with a welcome improvement in the mortality rate. In the original compilation there were 62 cases, and in 51 the operation included cholecystectomy and routine exploration of the common bile-duct. It seems fair to add a few notes on the type of patient and the cause of the five fatalities.

H.O., male, aged 71, was a poor risk, having but partially regained mental and physical health after a stroke three years previously. He progressed smoothly after removal of the gall-bladder for stones and exploration of the common bile-duct. At the end of two weeks pulmonary embolism occurred, and five days later a second attack of this killed him.

W.H., male, aged 90, was found to have a ruptured gall-bladder packed with stones. He made a good recovery for a week, had acute retention of urine, and slowly sank and died about the seventeenth day after operation.

F.A., female, aged 79, with torsion of gall-bladder, convalesced smoothly for three days, and died suddenly on the fourth day after operation from heart failure.

The other two deaths followed closely on operation. One, a male aged 57, died twenty-four hours after, and the other, a female aged 52, died two days later. The post-mortem examination in the latter showed fatty degeneration of the heart, liver and kidneys.

There is no reason to think these patients would have survived had general anæsthesia been used. On the other hand, I do think that the remaining fifty-five cases who recovered might have been less successful had they been denied the advantages of spinal anæsthesia.

It seems fair, therefore, to claim in upper abdominal work under spinal compared with general anæsthesia that (*a*) the dangers are no greater, (*b*) the chance of the patient's ultimate recovery is as great, (*c*) technical perfection is likelier and recurrent biliary troubles therefore fewer.

THE PSYCHOLOGICAL ASPECT.

Here is another fundamental factor involved in this matter. Though considered last, it is of first importance. Many critics, medical and lay, express abhorrence of being conscious while undergoing operations. Although a natural, it is not necessarily a profound view. The patient and the surgeon need to realize the truth that the price paid for temporary oblivion is a considerably greater risk of ultimate failure, in support of which contention cogent arguments have already been given.

The practice of Finsterer, one of the great gastric

surgeons, endorses it further, and shows that patients' scruples on the score of consciousness may be overcome. He employs merely local anæsthesia for partial gastrectomy. This proves that with a little persuasion it is possible to satisfy the patient's mental needs as well as the bodily, so that he feels that this method is not only more beneficial but also sufficiently agreeable. Emphatically the demands on the doctor are far greater than is usual with inhalation anæsthesia. In fact, nothing less than exceptional exercise of his imagination, and the use of every art and all the tact the anæsthetist commands, suffice for the needs of the anxious patient. With this ideal in view, a little experience would make easy what at first seems burdensome. A share in this responsibility rests on all in the theatre.

As a rule the higher the level of operation the livelier the patient's awareness. Therefore, although this factor is relatively insignificant in the lumbo-sacral levels, it may be important in the hypogastric, and often is a pressing need when the surgeon is working in the upper abdomen. The encouraging words and hand-grasp of the anæsthetist during the ordeal of operation give the patient the comforting reassurance such as a hand-rail affords to one crossing a foot-bridge. Obviously a lumbo-sacral anæsthetic like a broad bridge means little risk, but where consciousness of the serious nature of the proceedings deepens, as in major abdominal operations, it is as if the plank is narrow. Then to feel that hand-rail is a matter of vital importance to nervous patients.

As the problem arises most acutely in these, its discussion has been postponed to this point. It is solved by grouping patients according to their mental make-up and the nature of their operation.

A.—Where an alternative to general anæsthesia is almost indispensable.

When patients are told that for the best result it is virtually essential for them to give their conscious collaboration at the operation almost all consent to spinal anæsthesia. Thus, when the breath is held during ascending pyelography a crisp picture is possible as diaphragmatic movements are eliminated. Where plasters have been applied to the pelvis and legs the patient who can look after the upper part of his body may facilitate the surgeon's work. The conscious patient requires less nursing attention, and often, say after cystoscopy, can go home the same day.

When a patient requiring operation has concomitant phthisis, diabetes, nephritis, or vomiting from intestinal obstruction, and reasons for preferring spinal anæsthesia are put to him, he usually consents readily.

B.—For those who dread not the operation but the (general) anæsthetic.

They are not a few, and for them spinal anæsthesia spells salvation. With them may be included a considerable percentage, mainly male, who while not afraid of narcosis are philosophical or phlegmatic enough to resign themselves to the numbing of their bodies. A few watch their operations in a mirror, inspect gall-stones or appendix at the time of their removal, and many marvel at the new "style."

C.—Those who wish to co-operate in what they are told is to their advantage but are imaginative and sensitive.

The anæsthetist needs to reassure and divert the patient's attention with appropriate conversation. A wet towel over the forehead and eyes, cotton wool in the ears and sips of water will afford comfort in the

taciturn. The nostrils and mouth are better uncovered, and as cooling draughts relieve the occasional air hunger, there is no objection to opening doors and windows. Oxygen or carbon dioxide inhalations at some or most of the time are useful to both mind and body in some cases. I saw Dr. Falkner Hill at Manchester recently keeping a patient stuporous, though responsive to pinching the skin of her neck, throughout a partial gastrectomy. At the close he had only used one or two drachms of chloroform in addition to the spinal anæsthesia. Often it is not till the viscera are handled or when after ten to twenty minutes a sense of faintness may distress the patient as the circulatory balance alters that the need for additional anæsthesia arises. It may, however, in nervy types be better to give it earlier and get over the "struggling stage" that sometimes occurs before the peritoneal cavity is opened.

Pre-operative morphia and scopolamine were tried in the first hundred or two cases, but their routine use is of dubious advantage. In many cases the effect is negligible, in some it induces vomiting, and in all, since susceptibility decreases at the second dose, the potency of the drug is reduced when its effect is most appreciated by the patient, i.e. when the operation is over.

D.—Those who require oblivion regardless of drawbacks.

They are mainly in the first half of life. Such require gas or other general anæsthetic during the operations, and sometimes even before the thecal puncture. Thanks to the spinal anæsthesia they need only receive a trifling dose, and the surgeon does not depend for relaxation on the influence of what is inhaled. Obviously if these happen to be diabetic

or jaundiced patients, or suffering from bronchitis or colds, they are at a disadvantage. Otherwise concomitant general anæsthesia is only a serious drawback, by complicating the picture somewhat if anxiety arises over lowered blood-pressure.

For this last reason I deem it necessary to proceed with caution in what at first seems the ideal solution of the anæsthetic problem in abdominal work, viz. premedication with basal narcotics like evipan, paraldehyde, or avertin, followed by spinal anæsthetic to gain perfect relaxation and operative tranquillity. Allured by such a combination I tried it on a succession of cases. The basal narcotic is apt to play tricks with patients. One nephrectomy patient needed several nurses to curb the violent and dangerous exertions which he exhibited for some twenty-four hours after operation, while another lady was found sitting on the floor voiding urine the night after appendicectomy.

However, such may be insufficient evidence on which to abandon such combinations. There are objections to giving (high) spinal anæsthesia to the narcotized. Correct placing for puncture of the theca is not always easy in the patient who while too drowsy to co-operate still resents the introduction of the needle. Secondly, the danger of basal narcosis in the susceptible patient is depression of the vital centres in the medulla. In the rare case where the resultant lowered vitality tends to be of a serious degree, an added fall of blood-pressure from the spinal anæsthetic makes it hard to revive the patient. Therefore where, for example, the paraldehyde-spinal combination is contemplated the possible slightly increased risk must be taken into account. Such a special indication as marked nervousness of the patient might well justify adoption

of light inhalation anæsthesia, and I think the best routine adjuvant is nitrous oxide, which can be switched off to oxygen and carbon dioxide inhalations when danger threatens.

E.—A brief general anæsthetic prior to thecal puncture.

Ethyl chloride is eminently useful, and I have found evipan helpful. The patient thereafter is left to sleep, or tranquillized if necessary by occasional drops of anæsthetic during the operation. I have employed this with excellent results in infants and intractable children, where acute appendicitis has gone on to peritonitis, and where with such emergencies or, say, acute osteomyelitis colds or chest infections are also present. In lumbar sympathectomy, where relaxation is a great asset, I have found it helpful. A double advantage accrues from spinal anæsthesia in septic peritonitis. It saves adding to the existing toxæmia and often deflates and empties a loaded stagnant bowel. This facilitates subsequent saline absorption by this route, where the need for intestinal rest restricts fluids by mouth.

THE PATIENT'S OPINION OF SPINAL ANÆSTHESIA.

What is the patient's opinion of spinal anæsthesia? Once experienced, do patients elect to repeat it? These are two vital questions on which I have collected some evidence from my wards at the Royal Infirmary during the months from April, 1935, to April, 1936.

	Spinal Anæsthesia (alone).	Spinal with General Anæsthesia.	For.	Against.
Men ..	90	20	95	15
Women	40	20	16	44

Obviously most of my male patients would prefer spinal if a second occasion arose. A few children have made its use a *sine qua non* for subsequent operations. I have repeated spinal anæsthesia the same day, and have used it again and again on some patients at their request—and without regret. A complaint of headache is quite a rarity, and no paralyses apart from a case of temporary squint and one of temporary deafness have appeared or are likely.

Thus in 1930 a woman aged 66, came with carcinoma of the left colon causing acute obstruction. For each of the three stages of her curative operation I gave spinocain. She still enjoys natural defæcation, good health, and does her usual work.

As a rule spinal anæsthesia is most favourable for patients in the latter part of life, which is fortunate, since both in their organs and the tissues involved in the operation they are less able to bear the added strain that general anæsthesia involves. They are calmer in mentality and start with the added advantage of a higher blood-pressure, although obviously they lack circulatory resilience. True, it is among these that the occasional anxieties and need for supra-renal injections arise. In no children or young folk has there been anxiety over lowered vitality.

It is a pleasant contrast to see "spinal" patients a few hours after their operation and compare their evident well-being with those who have been anæsthetized with ether and exhale it for a day or two after.

The help it affords in operating and the healing of wounds, often coupled with the appreciation of doctors and the gratitude of patients, encourage the continued use of spinal anæsthesia. Technique is satisfactory. Time is defining its scope.

SUMMARY.

1. A report is given on 1,529 cases of spinal anæsthesia. In approximately 90 per cent. no additional anæsthetic was used, and among these there were two deaths on the table. In the others some form of general or basal anæsthesia was added and one fatality occurred.

2. In a fraction per cent. it has been necessary to combat symptoms of shock by intravenous adrenalin, the effect of which is immediate and completely restorative.

3. The importance of a minimal dose is stressed, and use is made of varied dosage, level of injection and inclination of spine in controlling the distribution of anæsthesia. The phenomenon of *zonal* anæsthesia is described.

4. For the lumbo-sacral area, especially cystoscopic manipulation, it is unsurpassed; for the lower abdomen its advantages outweigh its disadvantages.

5. The debatable territory for its use is the upper abdomen. In this sphere it affords the greatest boon, where the patients are chronic invalids and ease of access is eagerly desired by the surgeon. Its chief danger, shock, which is here more apt to appear, is fully considered and its treatment described. Concomitant infiltration of the omentum and light general anæsthesia are often essential.

6. Contra-indications among acute and chronic cases are given.

7. In the acute emergency, where the surgeon is confronted with perforative peritonitis or intestinal obstruction often accompanied by some degree of an acute cold or bronchial infection, the avoidance of

respiratory irritants is important, whilst the frequent evacuation and deflation of a stagnant colon under spinal anæsthesia leaves the way clear for adequate colonic feeding and alimentary rest.

8. Statistics are given showing that, while the majority of women do not, most men do prefer spinal anæsthesia.

9. The only sequela of note is headache. It has appeared in a mild form in a few per cent., and rarely has it been severe or lasted more than a few days.

10. Reference is made to the added responsibility incurred by the anæsthetist both in recognizing the indications for spinal or combined spinal and general anæsthesia and in piloting the patient to and through the operation.

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HOW BRISTOL ROYAL INFIRMARY HAS WATCHED THE WORLD CHANGE.*

BY

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THE date 20th June has for Bristolians a double significance, for on 20th June, 1837, Queen Victoria came to the throne, and exactly one hundred years earlier (on 20th June, 1737) the Bristol Royal Infirmary first opened for the reception of patients, though the "official" opening was deferred until 13th December.

During the whole of these two hundred years the work of the Infirmary has continued by day and by night, unceasing and increasing. But it is difficult for us now fully to appreciate what this means—how really different was the Great Britain which the Infirmary's founders knew from that of to-day.

How many, in fact, realize that the Infirmary was opened in the reign of George II, and in the year of the death of his Queen, Caroline of Anspach? It was already well settled to work when the Battles of Dettingen and of Fontenoy were fought; when Charles Edward Stuart invaded England; when Frederick the Great came to his throne; when the first beginnings of the English novel appeared with Richardson's *Pamela*, Dr. Smollett's *Roderick Random*, and Fielding's *Tom Jones;* when Swift was writing to Pope, and the strange new sect of Methodists appeared in London.

* By courtesy of the *Editor of the Bristol Evening Post*.

In those days the British Empire, in which Ireland was a separate kingdom, consisted of a few small islands, Gibraltar, and the eastern coast of North America. Canada was French, South Africa Dutch, Ceylon Portuguese, India independent (except where the French had established themselves on the coast), and Australia unexplored. There were no railways, of course (the steam engine had not been invented), there were no newspapers, and hardly any roads that we should recognize as such, there were no pavements at all!

The calendar had not been "reformed," so that the year ended in March instead of December (hence the mistake in the date carved over the Infirmary door subsequently); surgeons were still (some at least) "barber-surgeons," while a licence to practise medicine could be obtained from a bishop; a pound of bread, a pound of beef, and four pints of beer was the regular daily ration for Infirmary patients.

The Infirmary was twenty years old when Mozart was born, and the Black Hole of Calcutta was followed by Clive's victory at Plassey, and British rule in India began. Soon after came the Battle of Minden, Wolfe's capture of Quebec, which gave Canada to Britain, and the accession of George III.

The Infirmary was thirty years old when the quarrel with the American Colonies began, and the steam engine and the "spinning jenny" were invented; Captain Cook made his first voyage to Australia (and showed the importance of what we now call vitamins!);* soon after Parliamentary debates were allowed to be published; newspapers (*e.g. The Times*) and the Royal

* For although since the time of Sir James Lancaster (*circa* 1592) East Indiamen were supplied with oranges and lemons for the prevention of scurvy, the Royal Navy ignored this knowledge until about 1790.—EDITOR.

Academy were founded; and Dr. Johnson set out on his tour of the Hebrides.

When the Infirmary was already fifty years old came the trial of Warren Hastings and the French Revolution; and when it was sixty years old Jenner proved the value of vaccination, and John Harvey's firm, of sherry fame, was founded.

A little later, when the upstart Napoleon Buonaparte became "First Consul" of the French, Humphry Davy at the Bristol Pneumatic Institute discovered the anæsthetic powers of "laughing gas"; Ireland was united with Great Britain, Malta was captured, and Ceylon and South Africa were added to Great Britain.

The Infirmary was seventy years old when the slave trade was abolished,* soon after the Battle of Trafalgar, and nearly eighty years old when the Bristol Eye Hospital and Eye Dispensary were founded, when Laënnec invented the stethoscope, the Battle of Waterloo was fought, and Napoleon sent to St. Helena.

George IV reigned and William IV came to the throne; the Infirmary was over ninety years old, and the first railway was opened between Liverpool and Manchester; the Bristol riots marked the first Parliamentary Reform Act; the Bristol General Hospital and Bristol Medical School were founded.

Quite at the end of the Infirmary's century came the first anniversary meeting (at the Infirmary) of the Provincial Medical Association, now the B.M.A.; Reform of the Poor Law; the beginnings of national

* The evidence given by an Infirmary student, Falconbridge, before the Parliamentary Committee is said to have been the chief factor that induced the Committee to report in favour of abolition. Falconbridge had the rare experience of surviving four voyages to West Africa as an "African (*i.e.* Slave-ship) Surgeon."—EDITOR.

education; the general Registration Act; the *Pickwick Papers;* and the accession of Victoria.

Even then, after a hundred years' work, the Infirmary looked out on a world very different from this. Salmon were still caught in the Thames; lighting by gas was a startling experiment; iron ships were unknown; duelling was frequent; "bleeding" was a commonplace measure; anæsthetics had not come into use; beer was a usual drink for children of six; there were no postage stamps and (think of it!) no Income Tax.

The triumphs of the succeeding hundred years we need not recapitulate. In the medical field they include the discovery of anæsthesia, the demonstration (by Dr. Budd of the Royal Infirmary) that typhoid and phthisis are infectious—the real starting-point of modern sanitation and public health—and the revolution in surgery brought about by Lister's antiseptic methods.

At least it cannot be denied that the preceding century saw Britain rise from mediocrity to the greatest Empire and the strongest Power in the world; while internally the abolition of slavery, of religious disqualifications, and of censorship of the Press, the introduction of Parliamentary Reform, and the development of steam power wrought fundamental changes in the lives and the thoughts of our countrymen.

And when we recall that all this took place during the first hundred years of the Infirmary's work, we can then begin to understand how truly venerable is the oldest provincial teaching hospital in the kingdom.

Reviews of Books

Historical Notes on Psychiatry. By J. R. WHITWELL, M.B. Pp. xii., 252. London: H. K. Lewis & Co. 1936. Price 10s. 6d.—Books dealing with the history of psychiatry are few. We appreciate the issue of this volume. As honorary librarian of the Royal Medico-Psychological Association, Dr. Whitwell has had ample opportunity of gleaning information of old practices. He shows that he has used his good fortune to the full. Passing through early psychiatry in the East and Egypt, he brings us to the Bible, the Talmud and Al Qurân. Next, he gives cases from the classics. The author deals with Pythagoras, Plato, Aristotle and with the classical medical writers to the end of the period he reviews. The period of the Middle Ages receives special consideration, as do also epilepsy, incubus (nightmare) and acedia (manic-depressive psychosis, schizophrenia and anxiety neurosis). The author completes the book with one hundred pages of translations and chronological data. The book is illuminating and fascinating. Many of the hypotheses held to-day date back to the Ancients. As the book terminates at the close of the sixteenth century, the complete growth of psychiatry is not described. We hope that a companion volume will be issued bringing the subject up to the present time. The book is published with the usual efficiency of Messrs. H. K. Lewis & Co.'s publications. Unfortunately, there is no index.

The Natural History of Disease. By JOHN A. RYLE, M.D., F.R.C.P. Pp. x., 438. London: Oxford University Press (Humphrey Milford). 1936. Price 15s.—Professor Ryle, who is now Regius Professor of Physic in Cambridge, has collected into a single volume many addresses and articles which he has delivered and written during the past ten or fifteen years. They illustrate admirably the genius for critical observation at the bedside which is the mint-mark of Guy's Hospital. It is not so much the discovery of new symptoms or new diseases that one learns from Ryle's writing, it is the

formed habit of first-hand observation that is worth studying and, according to the limits of one's ability, that is worth copying. In one of his addresses (on research in clinical medicine) he speaks of the great discoveries made by medical men who were "observational" rather than "experimental" in their methods of research. These essays are illustrations of the "observational" method written as though they are intended for leisurely reading. They are full of sound practical hints, the outcome of wide and varied experience which the general practitioner as well as the physician will enjoy and find profitable.

Elementary Genetics. By H. GRÜNEBERG. Pp. iii., 87. Illustrated. Edinburgh: E. & S. Livingstone. 1937. Price 1s. 6d.—The appearance of this little book in the Catechism Series, and its full title *Elementary Genetics for Students of Biology and Medicine*, will, it is to be feared, deceive many purchasers. It is accurate, remarkably complete, thoroughly up to date and for the most part very clearly written, but it is highly condensed, and it is certainly not elementary. The student of biology who has taken a comprehensive course in genetics will find it most valuable for revision and, small though it is, it need not be despised by the student who is about to take an honours examination in botany or zoology. To the medical student its appeal is more dubious. It is possible that the biology course at some medical schools might include as much genetics as is covered here, but that is most unlikely to be the case at the majority. The medical student in his final years who wishes to revise the subject in order to understand the rôle of heredity in the production of abnormalities and diseases will, it is to be feared, find the book much too difficult.

The Elements of Medical Treatment.—Third Edition. By R. HUTCHISON, M.D., LL.D., F.R.C.P. Pp. viii., 194. Bristol: John Wright & Sons, Ltd. 1937. Price 5s.—The third edition of this favourite book has been brought up to date with some minor alterations and additions. The chief alteration lies in the chapter on diabetes, which has been rewritten and constitutes a great improvement on the second edition. It is a pity that the book went to press before the introduction of protamine-insulin, so that this valuable improvement in insulin treatment is not mentioned. Of the other additions the more important are the inclusion of a paragraph dealing

with dyschezia as a cause of constipation, a description of the use of mandelic acid as a urinary antiseptic, and several references to Salyrgan and its allies. It is disappointing that so important a method of oxygen-administration as the "oxygen tent" has escaped notice.

High Blood Pressure. By I. HARRIS, M.D. Pp. xx., 132. London: Oxford University Press (Humphrey Milford). 1937. Price 10s. 6d.—The problem of the ætiology of essential hypertension has been examined by Dr. Harris and his team of workers by an elaborate series of investigations on the arterial pressure and the bio-chemistry of the blood and urine of a group of about twenty-five patients. In particular alterations in these were investigated under conditions of variation in the protein content of the diets. The net outcome of these researches is the conclusion that the essential cause of most cases of hyper-tension is to be found in excessive protein intake. In the development of this thesis Dr. Harris is led to much interesting theorizing and occasionally to some rather startling assertions. The greater part of the book is taken up with detailed discussion of the extensively tabulated results of experiments. These do not lend themselves to light reading, and the work is obviously for the close study and concentrated attention of the serious research student working in the fields of arterial pressure and kidney diseases.

Diagnosis and Treatment of Venereal Diseases. By DAVID LEES, D.S.O., F.R.C.S., F.R.C.P., F.R.S.E., edited by ROBERT LEES, M.B., F.R.C.P. Third Edition. Pp. xvi., 608. Illustrated. Edinburgh: E. & S. Livingstone. 1937. Price 15s.—Of all the diseases which occasionally meet with comparatively inefficient treatment venereal diseases probably take first place. Lack of knowledge would be no excuse after perusal of this work. Perhaps a more apt title would be "Diagnosis and Treatment of Venereal Diseases in the Male," for the space devoted to these conditions in regard to the female is relatively small and not as complete as is found in many works on gynæcology, while that part devoted to the venereal diseases in the male is comprehensive, though as brief as efficient description will allow. The book is written in a manner which is sure to make the subject clear to the most elementary student, a style not too common in medical literature. A chapter on the technique of the collection of specimens is particularly helpful. Many of

the illustrations are excellent, but there are some which might be omitted or with advantage replaced by something more enlightening ; for instance, there are two excellent photographs of a doctor with his eye to the eyepiece of a urethroscope : much more information would be imparted if the reader had a visual impression of what he, the doctor, saw at the other end. Here and there are statements which could not meet with universal approval in the profession, but such things are stimulating to thought and argument, and are not therefore to be deplored. There is much useful information in its pages, and the book should become popular among those for whom it is written.

Common Skin Diseases. Fourth Edition. By A. C. ROXBURGH, M.D., F.R.C.P. Pp. xxxii., 401. Illustrated. London : H. K. Lewis & Co., Ltd. 1937. Price 15s.—Roxburgh's *Common Skin Diseases* now holds such an established position among text-books of dermatology that little need be added to what has already been said in previous reviews. The production of a Fourth Edition within five years of the original publication speaks for itself. While not pretending to give an account of every skin disease it provides the student and practitioner with the essential details of diagnosis and treatment of those diseases which he is most likely to meet either in practice or in the examination room. The new edition contains twenty-six additional pictures, while the sections on erythema nodosum, urticaria and eczema have been modified in accordance with the most recent views on these subjects. The sections on varicose veins and skin conditions resulting therefrom has been revised by Mr. R. T. Payne, who has added a short account of the contra-indications to injection treatment. There can be little doubt that this is quite one of the best, if not the best, of the smaller books on the subject, which will amply repay the money spent on it.

Diagnosis of some Delusional Insanity Types in General Practice. By E. HOPEWELL-ASH, M.D. Pp. 64. London : John Bale, Sons & Danielsson. 1936. Price 2s. 6d.—The sub-titles of this booklet are somewhat confusing until one finds that the author reserves the term dementia præcox for a type of schizophrenia. The manic-depressive states are also considered. The plan of giving differentiating tables is useful, but the tables are not always accurate. For instance, depression and elation in manic-depressive states are not always logically

explained. Depression may descend suddenly "like a blanket" for no apparent reason. The author gives good case descriptions, but his use of repetition is somewhat tiresome. The booklet is written with the idea of assisting the general practitioner, and should, on the whole, prove useful. Unfortunately, although it is of pocket size, the paper cover and weak binding prevent it from being carried frequently.

The Common Neuroses. By T. A. Ross, M.D., F.R.C.P. Second Edition. Pp. xii., 236. London: Edward Arnold & Co. 1937. Price 10s. 6d.—A second edition of this practical book is overdue, and we welcome this more mature volume. Few books are its equal for common-sense information. In places the author appears to be using on his readers methods perhaps applicable to patients. For instance, doubt might be cast upon the accuracy of the statement that everyone has discomfort nearly every day. The statement may be true of those who are constitutionally manic-depressives when in their melancholic phases, but not to the majority of mankind. Trotter's remark that severe pain occurs to almost everyone every day is quoted as if unquestioned. However, the flaws are few, and the book will be useful to those practising the more elementary psychotherapy, but the treatment described could be undertaken by few general practitioners. The majority would be unable to give at least an hour to one patient without fear of disturbance by the telephone. The point is omitted by the author, yet a disturbance may interfere inconveniently with the process of free association. On the whole the book is well produced, and the index is valuable.

Diseases of the Testicle. By HAMILTON BAILEY, F.R.C.S. Pp. viii., 160. Illustrated. London: H. K. Lewis & Co. Ltd. 1936. Price 12s. 6d.—This small monograph is well up to the very high standard which has been set in the past by Mr. Hamilton Bailey's previous works. It is comprehensive and covers almost every aspect of the subject, and at the end of each chapter there is an admirable bibliography. It is excellently illustrated; the printing is well done and the indexing is accurate and detailed. As an easy and interesting way of covering the whole of this subject in a short time it is outstandingly good, and can be read without difficulty in a couple of evenings. The author and publishers are to be congratulated on the production of this handy little book.

Hay Fever. By CLIVE SHIELDS, B.M., B.Ch. Pp. viii., 58. Illustrated. London: Oxford University Press (Humphrey Milford). 1937. Price 7s. 6d.—This book is devoted to the advocacy of zinc ionization for the relief of hay fever, by the author's method. This method has in some mysterious way become rather a favourite in the lay press, possibly because of the anonymous book published for laymen on the same subject and at the same time. The treatment itself is by no means new—in the nineties it was described as going out of favour. But since many patients ask for it, a description of the technique has a definite value. The author appears to believe that this method is the only one worth considering, and to have a measure of success that his imitators must envy. But is it necessary to include a table to show that none of his patients have been relieved before coming to him? There are four photographic plates, a sketch of the innervation of the nose, too diagrammatic to be useful; and a cross section of the nose of that curious creature, the mugwump, adds to the interest of page 11. Four and a half pages of index seems an excessive allowance for 51 pages of text.

Obstetric Technique. By F. J. BROWNE, M.D., Ch.B., D.Sc., F.R.C.S., F.C.O.G. Pp. ii., 70. Shrewsbury: Wilding & Son Ltd. 1937. Price 2s.—This hand-book deals in detail with the technique to be observed by nurses and students in the Obstetric Department and district of the University College Hospital, London. The instructions are clear and well thought out, and are a model for any obstetric department. The management of labour and the treatment of abnormalities of pregnancy and labour are concisely defined. It is a very useful hand-book for obstetric clerks and nurses, but is not of universal application owing to the varying methods in use in different hospitals.

Safe Childbirth. By K. O. VAUGHAN. Pp. x., 154. Illustrated. London: Messrs. Baillière, Tindall & Cox. 1937. Price 7s. 6d.—This book, which makes interesting reading to all engaged in active midwifery, shows evidence of much research and thought, and will no doubt stimulate further interest in the bony pelvis, particularly in our conception of its shape and mobility. Dr. Vaughan claims that the brim of the normal pelvis is round, not heart-shaped. She certainly gives us fresh thoughts on this subject, and her views, which are illustrated by numerous diagrams and photographs, are well

supported by much data and information, gained by personal investigation of the customs of primitive peoples and numerous nations with their different classes and modes of living. Whether we agree with her conclusions or not, they certainly demand attention. In speaking of the puerperium, Dr. Vaughan is less certain of her facts, as most patients nowadays do active exercises during the puerperium and rarely lie flat on their backs except for very short periods, being nursed mainly in the Fowler position.

The Medical Cookery Book. Compiled by DOROTHY SEWART. Pp. 136. Bristol: John Wright & Sons Ltd. 1935. Price 2s. 6d.—This book contains 300 recipes "For the use of invalids, convalescents and children," and should be of great use to those responsible for their feeding. Economy and common sense are evident, and the methods described are on the whole simple. The book is practical and full of ideas, and one can imagine a most interesting menu such as liver cocktail, peptonized oysters, raw egg, *served without comment*, and a porter jelly.

Milk Products. By W. C. HARVEY, M.D., D.P.H., M.R.San.I., and H. HILL, M.R.San.I., A.M.I.S.E., M.S.I.A. Pp. viii., 387. Illustrated. London: H. K. Lewis & Co. Ltd. 1937. Price 16s.—The subject of milk has furnished quite a number of writers with a popular topic, and many authoritative books covering practically every aspect of this most essential food are available; but the products of which milk forms the prime basis and which, as a consequence, are equally important, appear hitherto to have been neglected. The authors have recognized this defect, and having themselves recently contributed a valuable text-book on the subject of milk, felt compelled to supply the want: and this book makes a welcome appearance as a companion treatise to their own *Milk-Production and Control*. The place of importance in the first chapter is devoted to ice-cream. It is rightly given prominence and most efficiently dealt with. Commencing with an historical survey, its food value, sources of bacteria, the scientific investigation of epidemics and diseases transmitted by ice-cream are all exhaustively dealt with. The method of manufacture is fully explained, and the analytical and bacteriological data are valuable sections. Practical suggestions are made for more efficient legislative control. The other principal products of milk are dealt with in separate

chapters, each compiled on the same standard plan, so that adequate comparison can be made from section to section. The book is well written and the matter presented in an interesting and easily readable form. It is well interspersed with illustrated diagrams and completed with a very full index. *Milk Products* is essentially a public health text-book, and will prove of special value to Medical Officers of Health, Sanitary Inspectors and Public Health officials generally, whose duties are concerned with the supervision of our food supply.

The Diet Book for Doctor, Patient and Housewife. By M. R. REA. Third Edition. Pp. xvi., 255. London: Oxford University Press (Humphrey Milford). 1937. Price 6s.—Although the first edition of this book appeared in 1931 this is the first edition that has been sent to us for review. In his foreword to the first edition Sir James Purves Stewart described it as an ingenious and carefully thought out diet book. This is certainly a true description. Mrs. Rea has evidently wide practical experience and realizes that invalid cookery has suffered much in the past from want of variety. The reader's first impression may be that there are many items that are unknown to British cookery, that many of the dishes sound too foreign for English palates. But when one reflects on the insipidity and sameness of the invalid diets which are customary in this country, when as doctors we recall the difficulties of persuading patients to endure the dietetic restrictions we are compelled to order, Mrs. Rea's skill in arranging varied menus for invalids will be warmly appreciated. Not the least valuable part of her book consists in her wide range of cookery recipes which do not entail either too expensive or too elaborate preparations. Here and there she omits to explain how a particular article is prepared, as, for example, when she ends the recipe for the delicious soup known as "Bortsch" with the remark "Pirozhkis are a good accompaniment." Careful search through the book and its index has failed to reveal what "Pirozhkis" are. Another minor criticism suggests itself in the Obesity Dietary; it is assumed that the patient has the discretion to know how much he shall eat, but there is no hint of any limit to the amount of lean meat, fish and dry cheese that is advisable. Moreover it is stated that Vita Weat and Ryvita may be taken with all meals, no quantities being given. Yet there are general directions that starchy foods should be restricted. Now the carbohydrate content of Vita

Weat and Ryvita is in each case 21·2 grammes per ounce, whereas the carbohydrate content of white bread is only 15·5 grammes per ounce. It may be that white bread is more tempting to the palate and more of it is likely to be eaten, but no such explanation is given to the patient or the doctor. Again, there is a special warning against potatoes, but boiled potatoes either new or old contain less than 6 grammes of carbohydrate per ounce. These oversights are probably not Mrs. Rea's but those of Marcovici, whose dietaries she quotes. As an invalid cookery book this is to be commended most highly.

Modern Dietary Treatment. By MARGERY ABRAHAMS, M.Sc., and ELSIE M. WIDDOWSON, B.Sc., Ph.D. Pp. ix., 328. Baillière, Tindall and Cox. 1937. Price 8s. 6d. net.—Here at last is a book of dietetics based on English foods and English cookery! That does not mean that our foods or our ways of cooking are the best; what it means is that we are no longer dependent on Sherman's tables, which, admirable as they are, are not accurate analyses of English foods as our patients eat them. The food tables in this book have been compiled from the analyses made by Dr. McCance and his co-workers under the auspices of the Medical Research Council. In many instances the values differ so widely from those given by other authorities as to render these new tables indispensable to all doctors and dietitians in the British Isles. The general principles of nutrition are briefly and clearly laid down in the opening chapters. There follow chapters dealing with diets appropriate to certain diseases. More than half the book consists of detailed diets with cooking recipes. The variety allowed is excellent, all the dishes are those which are customary in this country. The contents of diets in protein, carbohydrate and fat are, where necessary, clearly calculated. There are many valuable tables at the end of the book. Unhesitatingly we place this work as being the most scientific of the smaller dietetic handbooks published in this country; and this is not altogether unexpected, seeing that the authors are dietitian to St. Bartholomew's and bio-chemist to King's College Hospitals respectively.

Editorial Notes

The late Mr. James Arrowsmith-Brown.

When Mr. James Arrowsmith died in 1913 the Editor of the *Journal* wrote of him: "He was always greatly interested in the welfare of the *Journal* . . . we were fortunate in obtaining the assistance of one whose whole heart was in the work."

The good fortune of the *Journal* continued under his nephew and successor, Mr. James Arrowsmith-Brown, whose death we so deeply deplore. There is a popular idea that publishers and writers do not always work in harmony, and that the former live by exploiting the successes of the latter. It is not believed that publishers ever contribute to a writer's success or bear the cost of the failures. However this may be, there is no question of the debt which editors of professional journals owe to their printers and publishers. The editorial committee of a medical journal is especially liable to be a band of amateurs. In our own case we acknowledge to the full the constant help and guidance given to this *Journal* by the late Mr. Arrowsmith-Brown. His judgment was as invaluable as his friendship was precious.

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Tuberculosis Conference in Bristol.

The Twenty-third Annual Conference of the National Association for the Prevention of Tuberculosis met in Bristol on the 1st, 2nd and 3rd July, in the Physics Laboratory of the University. Owing to ill-health, Sir Robert Philip,

Chairman of the Council of the Association and President of the Conference, was unable to attend. His absence from the Conference, for the first time in twenty-three years, was the more regretted since the session on Saturday, 3rd July, had been specially arranged to commemorate the jubilee of his opening of the first British tuberculosis dispensary at Edinburgh in 1887. The *Medical Officer*, in its editorial comment on the Conference, says that its atmosphere was rather different from that which has ruled in past years. The best thing that can be said about it is that what it did could never have been done before . . .

"In the session devoted to nutrition we heard the phrase 'self-selected diet' running through the discussion as a *leit-motif*. It was used first by Dr. Nixon, Emeritus Professor of Medicine, University of Bristol, in his opening speech, and cropped up with each subsequent speaker, to be used finally in the vote of thanks to the Chairman, Professor Lyle Cummins. It marks a definite advance in our knowledge of nutrition. Before we had a science of nutrition 'eat what you like' was the only guide to our requirements. Now that we know much about the subject it comes back again, but with rather a different meaning. For now we can apply what we know of the needs of man to suit the special needs of each individual. Preventive medicine is becoming the fitting of general physiological science to individual physiological variation. This is the characteristic of 1937 which is permeating all our discussions. Though we do not intend to refer here to the individual papers, we must mention one speaker whose name was not on the schedule and of whose words there is no printed record. We refer to Dr. Fred M. F. Meixner, of Illinois, who attended as the representative of the National Tuberculosis Service of the United States. Dr. Meixner spoke extempore, but he had many important things to say, so we hope that a full report of his speech will be available. What he said clung round the characteristic—the variation of what we know to be generally right to suit the variations of the recipients. He spoke of open-air treatment in Chicago, where for three months of the year the temperature is expected to be below zero, of the swamping of appetite by vast volumes of milk, of the dangers of homework to children who are fatigued

by it, and of the influence of maladjustment in the development of adolescent tuberculosis.

"Another note dominating the conference was the dictum—what is right for the management of the diseased is right for the healthy to prevent their becoming diseased. Here caution is required, else we shall get back to 'preventive surgery,' which led us towards disaster. But in general the policy is sound. If ventilation, nutrition and so on are of value in helping the diseased back to health, why not give these advantages earlier and stop them from becoming diseased at all?"

The *Medical Officer* mentions another less encouraging feature of this Conference: "His Majesty's Government debarred school medical officers from taking part in a discussion on open-air schools."

Now what exactly is His Majesty's Government afraid of? A sort of climatic independence that is bred in Bristol?

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Elections to United Honorary Staffs of B.R.I. and B.G.H.

THE first elections to the united honorary medical staffs of the Royal Infirmary and General Hospital were made on 25th May, 1937, when the election committees of the two institutions met in the Board Room of the Royal Infirmary as a Single Committee. This step was adopted to bring into existence a single Radiological Department. Drs. F. G. Bergin, G. B. Bush and S. B. Adams were appointed to the charge of the new department. In the case of the two former the elections confirmed them in duties they had formerly discharged to the General Hospital only. Dr. Adams is a graduate of Bristol University, whom we welcome back as the "first foot" on the "amalgamation" threshold.

Obituary

J. A. ARROWSMITH-BROWN, D.S.O.

WHEN this *Journal* was first produced in 1883, under the Editorship of Greig Smith, the firm of J. W. Arrowsmith, of Quay Street, undertook its printing and publication. It will perhaps help one to appreciate how far we have moved since then if it is pointed out that in it were articles disputing Koch's recent discovery of the tubercle bacillus. Thus, for the whole of the fifty-four years during which modern scientific medicine has developed, the firm of Arrowsmith has been to a very considerable extent responsible for the very high standard of production and the regular appearance of our *Journal*. For this we owe a deep debt of gratitude to two men, J. W. Arrowsmith and his nephew J. A. Arrowsmith-Brown. Our obituary notice of J. W. Arrowsmith in 1913 referred to his many-sided character and to the very great share that he had taken in the foundation of Bristol University. His nephew's work, particularly in regard to the University Colston Research Society, has been equally noteworthy. It is with the very deepest sorrow that now, twenty-four years later, we have to record the death of his nephew and successor as head of the firm, James Arnold Arrowsmith-Brown, who died at his home at Abbot's Leigh on 15th June last, at the relatively early age of fifty-four.

His many services to the community have been more suitably related in the public Press, so here we may perhaps try and show what manner of man he was. Whatever he had to do, either in work or play, he did with the utmost keenness, and whether it was the production of a book, the restoration of a church, or the playing of a game of cricket with his family, he always gave of his best with an entire absence of self-advertisement. As is usual with such a character, he was intolerant of hypocrisy and any form of self-seeking. During the War his outstanding success as an officer responsible for the communications of a Division was entirely due to his keenness and unselfishness. Although dealing with a highly technical subject for which he had no particular bent, his tireless energy, good fellowship, and

consideration for those under his command rendered his services of the utmost value. As a friend one could argue good-humouredly with him on any subject, and then, not having seen him for a long period, start again where one had left off. Latterly his link with the Medical Profession became a very close one. For seven years, cheerfully and courageously, he carried on in spite of failing health. He tackled the problem of his illness with the same determination that he gave to all else, and refused to give in, rather tending to take on fresh responsibilities when most of us would have felt justified in retiring from active life altogether. This cheerful refusal to accept defeat was also evident during the dark days of the War in his treatment of those who could only see the black side of things.

His life has been held up by the Vice-Chancellor of the University recently as an example to be emulated by the younger generation.

We offer our profoundest sympathy to his widow and family.

Meetings of Societies

Bristol Medico-Chirurgical Society

THE seventh meeting of the session was held on Wednesday, 14th April, at 8.30 p.m.

Mr. A. E. Iles was in the Chair, and fifty-two members were present.

Dr. Fraser showed pathological specimens.

Mr. John Wright gave a paper entitled **"The Management of Throat and Nose Infections in Childhood."** Considerable discussion followed, which was contributed to by Mr. Iles, Professor Davy (for Professor Perry), Mr. Hutchinson, Mr. Scarff, Dr. Fraser, Mr. Angell James, Dr. Frank Bodman, and Dr. Gee.

The eighth meeting of the session was held on Wednesday, 5th May, at 8.30 p.m.

Dr. Richard Clarke was in the Chair.

The first Carey Coombs Memorial Lecture was delivered.

The Lecturer, Mr. Laurence O'Shaughnessy, took for his subject **"The Pathology and Surgical Treatment of Cardiac Ischæmia."**

The Medical Library of the University of Bristol,

WITH WHICH IS INCORPORATED

The Library of the Bristol Medico-Chirurgical Society.

The following donations have been received since the publication of the list in May, 1937.

	June, 1937.
American Laryngological Association (1) ..	1 volume.
American Laryngological, Rhinological and Otological Society (2)	1 ,,
American Otological Society (3)	1 ,,
Mrs. B. Howell Jones (4)	6 volumes.
Messrs. H. K. Lewis and Co. Ltd. (5) ..	1 volume.
Milk Nutrition Committee (6)	1 ,,
Otago University Medical School (7)	1 ,,
The late Dr. George Parker (8)	15 volumes.
Mr. E. Watson-Williams (9)	4 ,,
Dr. P. Watson-Williams (10)	1 pamphlet

Unbound periodicals have also been received from Professor E. W. Hey Groves, Professor C. Bruce Perry, Dr. J. Odery Symes and Dr. T. Milling.

THE ONE HUNDRED AND FIFTY-NINTH LIST OF BOOKS.

The figures in round brackets refer to the figures after the names of the donors. The books to which no such figures have been attached have either been bought from the Library Fund or received through the *Journal*.

Allen, F. M. B. ..	*Aids to the Treatment of Diseases of Children*	7th Ed.		1937
Bailey, Hamilton ..	*Clinical Surgery for Dental Practitioners*		(5)	1937
Bailey, Hamilton ..	*Diseases of the Testicle*			1936
Blacker, C. P.	*A Social Problem Group?*			1937
Boerhaave, H.	*Medical Correspondence*		(8)	1745

Boerhaave, H.	*A Method of Studying Physick.* Trans. Samber	(8)	1719
Budd, George	*On Diseases of the Liver* 2nd Ed.	(4)	1852
Carpenter, Wm. B.	*Principles of Human Physiology* 4th Ed.	(4)	1853
Castle, W. B., and Minot, C. R.	*Pathological Physiology and Clinical Description of the Anæmias*		1936
Charterhouse Rheumatism Clinic.	*Original Papers.* Vol. I		1937
Clowes, F., and Coleman, J. B.	*Quantitative Chemical Analysis* 8th Ed.	(9)	1909
Cooke, J.	*Supplementum Chirurgiæ*	(8)	1655
Coombs, C. F.	*Rheumatic Heart Disease*	(8)	1924
Descour, L.	*Pasteur and his Work.* Trans. by Wedd	(8)	1922
Dickinson, K. Shallcross	*The Main Points of Chemical Warfare from the Medical Aspect*		1937
Evans, Griffith	*Latent Syphilis and the Autonomic Nerve System* 2nd Ed.		1937
Gray, H.	*Anatomy, Descriptive and Surgical* 7th Ed.	(8)	1875
Gray, H.	*Anatomy, Surgical and Practical* 11th Ed.	(9)	1887
Hammond, T. E.	*Infections of the Urinary Tract*		1935
Harris, I.	*High Blood Pressure*		1937
Harris, Wilfred	*The Facial Neuralgias*		1937
Hopewell-Ash, Edwin	*Diagnosis of some Delusional Insanity Types in General Practice*		1936
Hutchison, Robert	*Principles of Diagnosis, Prognosis and Treatment* 2nd Ed.		1937
Jenner, Edward	*The Notebook of Edward Jenner*	(8)	1931
Le Clerc	*The Compleat Surgeon* 6th Ed.	(8)	1725
Le Fleming, E. Kaye	*An Introduction to General Practice*		1936
Lyle, K. and Jackson, S.	*Practical Orthoptics in the Treatment of Squint*		1937
MacMichael, W.	*The Gold-Headed Cane* 2nd Ed.	(8)	1828
Mead, Richard	*A Short Discourse concerning Pestilential Contagion*	(8)	1722
Milk and Nutrition.	Part I	(6)	1937
Miller, James	*Principles of Surgery.* 2nd and 3rd Eds.	(4)	1852–3
Ministry of Health	*Advisory Committee on Nutrition.* First Report		1937
Morton, Dudley J.	*The Human Foot*		1935
Osman, A. Arnold	*Original Papers of Richard Bright on Renal Disease*		1937
Paterson, Donald	*Sick Children, Diagnosis and Treatment* 2nd Ed.		1937
Prout, William	*On the Nature and Treatment of Stomach and Renal Diseases* 5th Ed.	(4)	1848
Quain, Jones	*Elements of Anatomy.* Vol. II 5th Ed.	(4)	1845
Roche, A. E.	*Urology in General Practice*		1938
Sachs, Wulf	*The Vegetative Nervous System*		1936
Schwarz, G., Goldberger, J. and Crocker, C.	*Diseases of the Colon and Rectum*		1937
Sears, W. Gordon	*Vade Mecum of Medical Treatment*		1937
Semon, Felix	*Forschungen und Erfahrungen,* 1880–1910. 2 Vols.	(9)	1912

Smart, Morton	*Graduated Muscular Contractions*			1936
Smith, N. Ross	*Elements of Orthopædic Surgery*			1937
Snell, Sidney H.	*A Doctor at Work and Play*			1937
Sprigge, S. S.	*Physic and Fiction*	(8)		1921
Stockman, R.	*Rheumatism and Arthritis*	(8)		1921
Thornton, R. J.	*A Family Herbal*	(8)		1814
Vaughan, Kathleen	*Safe Childbirth*			1937
Watson-Williams, P.	*Tecnica personale di esplorazione dei sini paranasali*	(10)		1937
Whitwell, J. R.	*Historical Notes on Psychiatry*			1936
Woodall, J.	*The Surgeon's Mate*	(8)	1639 (?)	
Zimmern, A. and Perol, P.	*Electro-Diagnosis in War*	(8)		1918

TRANSACTIONS, REPORTS, JOURNALS, ETC.

Medical Annual, 1937		1937
Proceedings of the University of Otago Medical School. No. 14	(7)	1937
Quarterly Cumulative Index Medicus. Vol. 20 (1936)		1937
St. Thomas' Hospital Reports. Vol. LVIII (1934)		1936
Transactions of the Fifty-eighth Annual Meeting of the American Laryngological Association	(1)	1936
Transactions of the American Laryngological, Rhinological and Otological Society. Forty-second Meeting	(2)	1936
Transactions of the American Otological Society. Vol. XXVI	(3)	1936

Publications Received

From EDWARD ARNOLD & Co.:

The Common Neuroses. By T. A. Ross, M.D., F.R.C.P. 2nd Edition. Price 10s. 6d.

From JOHN BALE, SONS & DANIELSSON LTD.:

Failure of the Heart and Circulation. By TERENCE EAST, M.A., D.M., F.R.C.P. Price 2s. 6d.

From DR. P. BARON:

Conduite à tenir en presence d'une colibacillose urinaire chronique. By Dr. PAUL BARON. Price 5 francs.

From J. M. DENT & SONS LTD.:

What is Osteopathy? By CHARLES HILL, M.A., M.D., D.P.H., and H. A. CLEGG, M.A., M.B., M.R.C.P. Price 7s. 6d.

From WILLIAM HEINEMANN LTD.:

Clinical Contraception. By GLADYS M. COX, M.B., B.S. 2nd Ed. Price 7s. 6d.

From H. K. LEWIS & Co. LTD.:

Milk Products. By W. CLUNIE HARVEY and H. HILL. Price 6s.

Common Skin Diseases. By A. C. ROXBURGH, M.A., M.D., B.Ch., F.R.C.P. 4th Edition. Price 15s.

The Morphine Habit. By G. LAUGHTON SCOTT, M.R.C.S., B.A. 2nd Edition. Price 5s.

From E. & S. LIVINGSTONE:

Botany. Part II. (Catechism Series.) 4th Edition. Price 1s. 6d.

Elementary Genetics. By HANS GRÜNEBERG, Ph.D., M.D. Price 1s. 6d.

From OXFORD UNIVERSITY PRESS:

Chronic Miliary Tuberculosis. By CLIFFORD HOYLE, M.D., M.R.C.P., and MICHAEL VAIZEY, M.B., M.R.C.P. Price 12s. 6d.

The Control of Tuberculosis in England. By G. GREGORY KAYNE, M.D., M.R.C.P., D.P.H. Price 8s. 6d.

Diseases of the New Born. By ABRAHAM TOW, M.D. Price 27s. 6d.

Tweedy's Practical Obstetrics. 7th Edition by SOLOMONS and FALKINER. Price 25s.

From JOHN WRIGHT & SONS LTD.:

British Journal of Surgery. Vol. XXIV. No. 96. (April, 1937.) Price 12s. 6d.

Local Medical Notes

EXAMINATION RESULTS.

University of Bristol.—Students of the University have recently passed the following examinations:—

M.B., Ch.B.—*First Examination. Pass:* Doris E. Counsell, Moragh J. Dickson, Mary D. Dixon, Elizabeth Hodson, A. G. H. Mitchinson, J. L. Pardoe, Margaret Savile, I. F. R. Sutherland, G. H. Valentine, R. F. Brooks, J. Deighton, J. Jones, N. Slade. *Second Examination* (*Section I*). *Pass:* K. L. Brown, J. T. N. Cole, D. I. Fullerton, F. J. Goddard, P. Legat, Madeleine I. Finzel, T. E. Lloyd, H. Mullen, R. W. Orton. *Final Examination* (*Section I*). *Pass:* Sybil M. Williams. (*Section II*). *Pass:* P. B. Ryan (*with Second Class Honours*), Daphne V. Dennis, J. P. M. Forde, C. R. G. Howard, N. R. Matheson, A. N. H. Peach (with Distinction in Surgery), J. W. E. Snawdon, A. M. Spencer, R. Tallack, P. Zimmering, H. James, Aldyth D. Jones, P. N. Heron, P. K. Jenkins.

B.D.S.—*First Examination. Pass:* F. C. Bryant, P. B. Carey, G. Hellings, G. K. G. Jennings, Sarah Jones, P. M. Nicholas. *Second Examination. Pass:* F. C. Baker. *Third Examination. Pass:* R. J. Gething, G. H. Bell, J. E. H. Bell, J. F. Blenkinsop, J. R. D. Gordon, A. A. Grant (with Distinction), G. R. Styles.

L.D.S.—*First Examination. Pass:* W. D. Arnold, G. J. Mills. *Second Examination. Pass:* D. G. Davies, J. R. Herbert, J. W. S. Jenkins, C. R. Sage, J. C. Jowett, R. B. Stiles. *Third Examination. Pass:* J. F. Durie, L. K. A. S. Oxley, Peggy Rooke, H. B. Harding, D. M. Sanders, L. H. Barker-Tufft, F. W. Clift, K. A. Gordon-Ralph, G. H. Hudson, E. L. Manton, R. H. G. Sims, Mary E. Thomas, May A. Trump, L. N. Weale, E. S. Wolfson. *Final Examination. Pass:* M. G. Davies, J. B. Inverdale, P. H. S. Paine, H. W. Williams, J. G. Windmill.

Midwife Teachers' Certificate Examination (Part II). Pass: Annie A. Barnes, Frances E. L. M. Harper, Dorothy Humphreys.

Conjoint Board. — M.R.C.S., L.R.C.P. — *Pass: In Pharmacology and Materia Medica):* R. T. Moore. *In Medicine:* E. J. Lace. *In Surgery:* Mabel W. N. Tribe, R. L. J. S. Derham, J. H. Bulleid. *In Pathology and Midwifery:* P. W. J. Parkes. *In Pathology:* Rotha H. Dalton.

L.D.S., R.C.S. — *Pass: In Special Anatomy and Physiology:* S. G. Sheffield. *Final Examination (Part II). Pass:* J. R. P. Thomas.

Royal College of Surgeons.—F.R.C.S.—*Primary:* S. D. Loxton.

APPOINTMENTS.

B.R.I. and B.G.H., Radiological Department.—Drs. F. G. Bergin, G. B. Bush and S. B. Adams.

The Long Fox Memorial Lecture will be delivered in the University on Tuesday, 19th October, 1937, at 8.30 p.m., by Professor V. B. Green-Armytage, M.D., F.R.C.P., F.C.O.G. Subject: **"The Debt of Western Medicine to the East."**

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Bristol Royal Infirmary Bicentenary.—The arrangements for the celebration of this anniversary are now well in hand. The Lord Mayor has generously offered to hold a civic reception in the evening of 21st October, and there will be a dinner, and possibly a dance, on 22nd October. It is hoped these will afford opportunities to all classes interested in the Infirmary—Patrons, Governors, Staff, and past and present Students and Nurses. We would particularly ask former Students to remember the date. Further particulars will be published later, or can be obtained from the Honorary Secretary of the Bicentenary Celebrations Committee, Mr. E. Watson-Williams, 65 Pembroke Road, Clifton, Bristol 8.

Royal College of Surgeons of England.—The Eighth Macloghlin Scholarship has been awarded to David Somerset Short, of Bristol Grammar School.